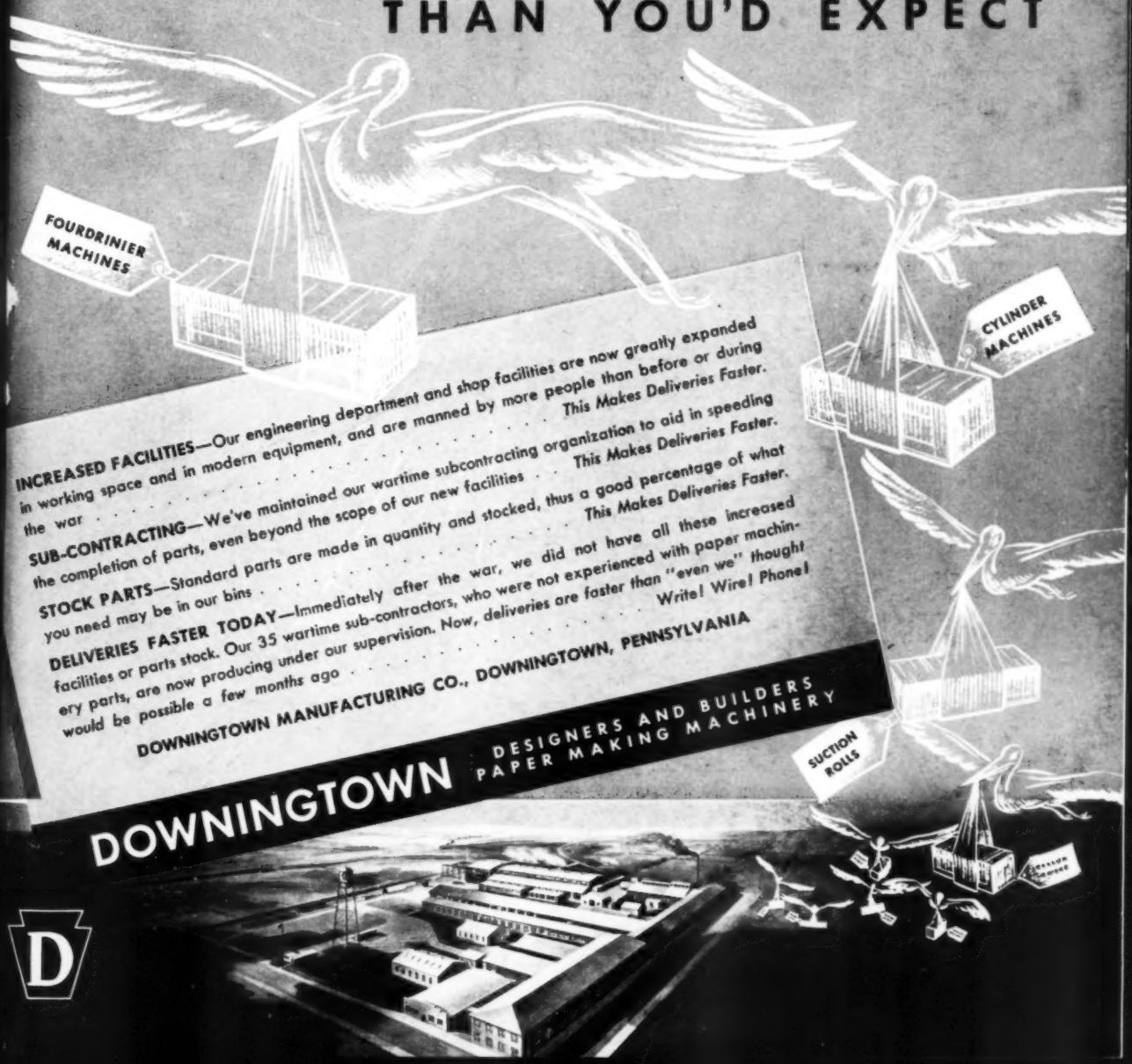
THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE—NOVEMBER, 1947

NOV 26 1947
DETROIT

Deliveries "FASTER" THAN YOU'D EXPECT



INCREASED FACILITIES—Our engineering department and shop facilities are now greatly expanded in working space and in modern equipment, and are manned by more people than before or during the war . . . . . This Makes Deliveries Faster.

SUB-CONTRACTING—We've maintained our wartime subcontracting organization to aid in speeding the completion of parts, even beyond the scope of our new facilities . . . . . This Makes Deliveries Faster.

STOCK PARTS—Standard parts are made in quantity and stocked, thus a good percentage of what you need may be in our bins . . . . . This Makes Deliveries Faster.

DELIVERIES FASTER TODAY—Immediately after the war, we did not have all these increased facilities or parts stock. Our 35 wartime sub-contractors, who were not experienced with paper machinery parts, are now producing under our supervision. Now, deliveries are faster than "even we" thought would be possible a few months ago . . . . . Write! Wire! Phone!

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DOWNINGTOWN DESIGNERS AND BUILDERS PAPER MAKING MACHINERY

D

–count on UFORMITES 467 and 470 to meet requirements at low cost

Sanitary garbage bags *must* have high wet strength properties to prevent breakage. Here, as in many other applications, the UFORMITES supply that important quality . . . efficiently, economically.

UFORMITE 467 was specifically developed for use with Kraft by beater addition. UFORMITE 470 is recommended especially for sulfite stocks but can be used advantageously with Kraft, rag and groundwood.

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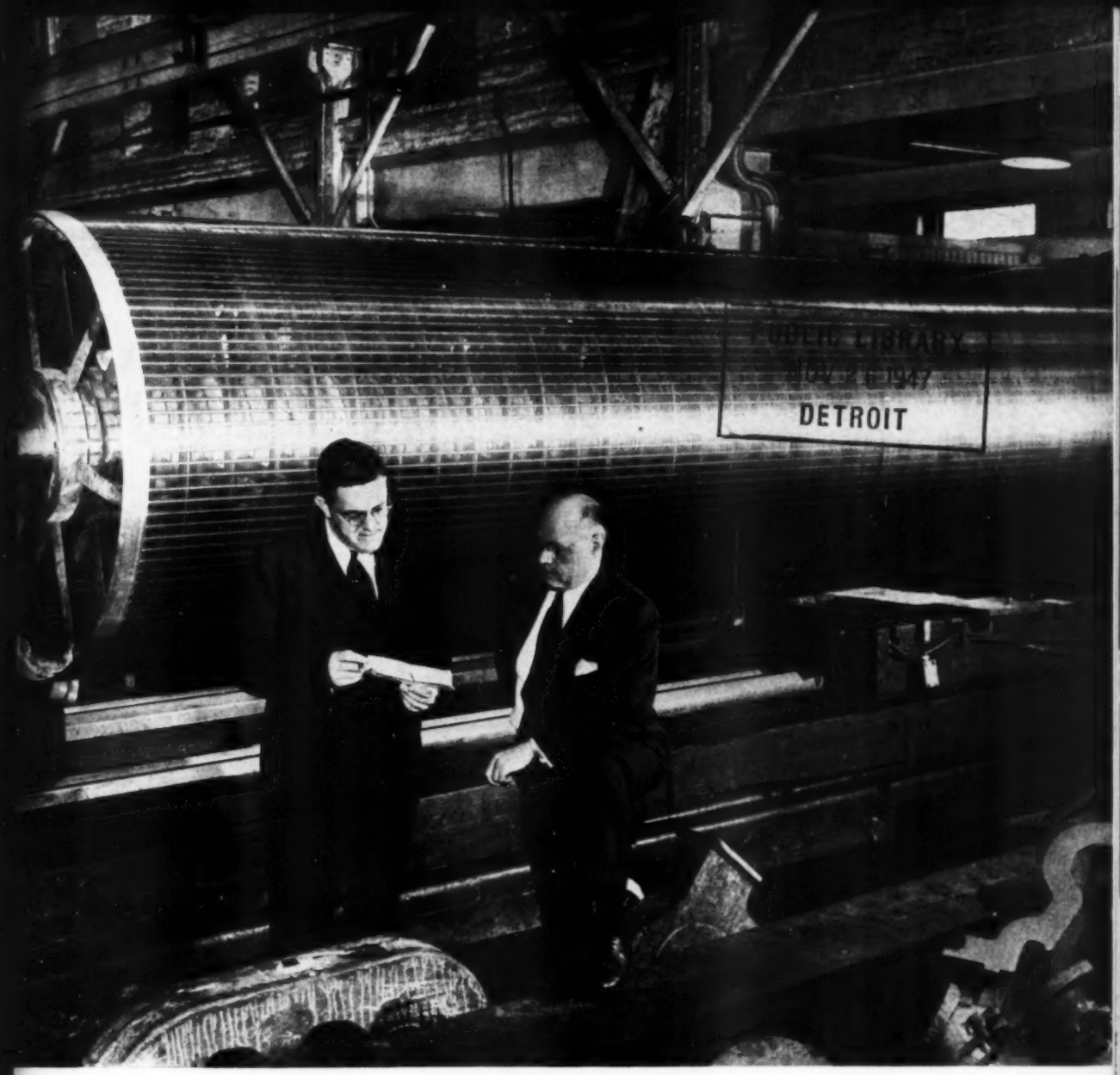

A big production picture

Above: world's largest cylinder mold, weighing over 20,000 pounds, for one of Beloit's post-war cylinder machines . . . incorporating many new and improved design features. To keep parts like these flowing through the shop, the sales department, here represented by Sales Engineer Francis Ramsden (*left*), is in almost daily contact with Production Manager Walter Dundore. *Beloit Iron Works, Beloit, Wisconsin.*

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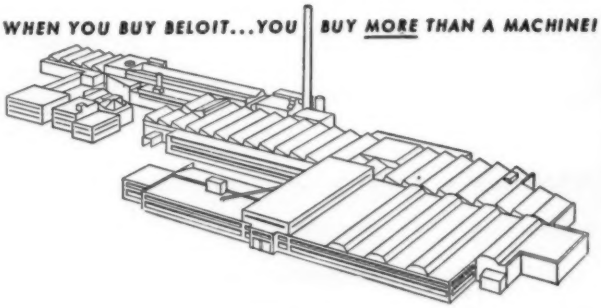

BELOIT

PAPER MACHINERY

We're not resting on our laurels... or on anything else, thank you!

The engineers at Moore & White would be definitely depressed if they felt that they had shot their bolts on the newly designed Cutters, Winders, Re-winders, and Lay Boys which are now available to you.

Naturally, we think that these and our other paper-making machines have the edge in advanced design as well as in dependable precision construction. Our growing family of customers seems to feel the same way about it.

But resting on our laurels has no place in Moore & White policy. The drafting room is always lengths ahead of the shop... a healthy condition, you will find, when it sharpens its pencils to custom-design *your* paper-making machinery.

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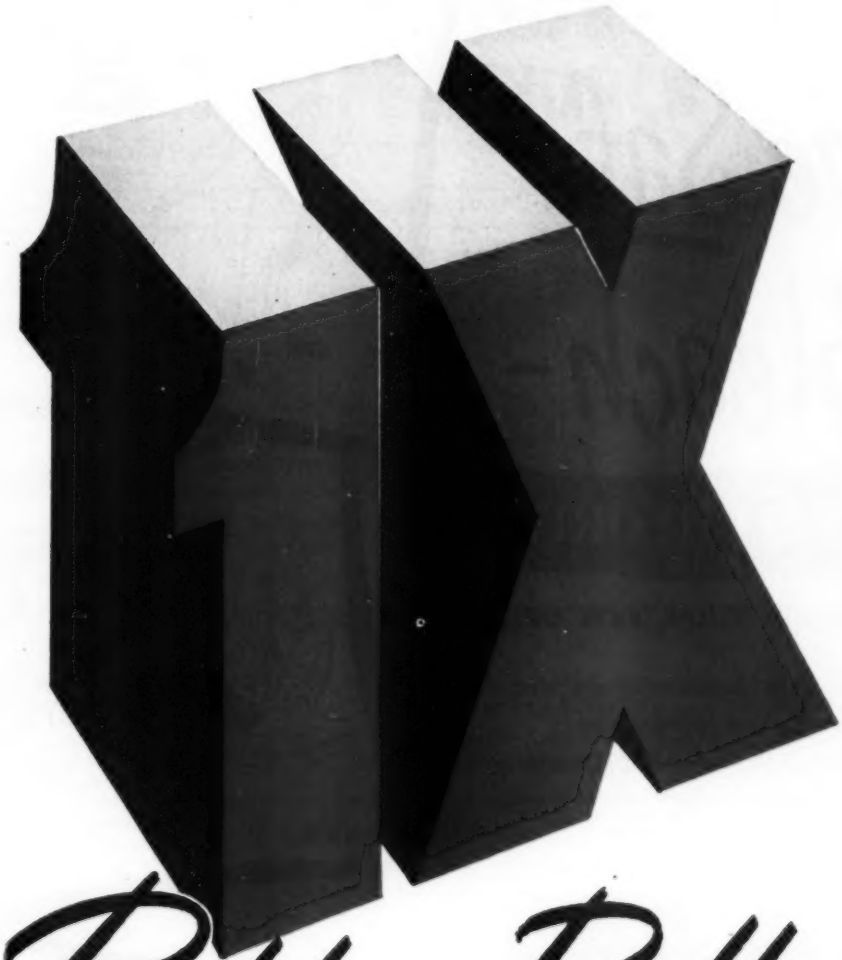

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"No. 1" is the universal symbol for Top Grade Crude Rubber. But there is a superlative grade that is even better than No. 1. It is the world's finest Crude Rubber —from selected plantations of outstanding stock—for which Stowe-Woodward, Inc. pay a premium to use in your rolls. *Its symbol is "IX".* IX Premium Rubber is processed with Stowe-Woodward's IX Premium Craftsmanship to give you the finest rubber rolls that money can buy.

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When most standard bleaching agents have oxidized up to a certain point—comes the attack! Fibers are tendered; pulps lose strength; fats revert . . . further bleaching must stop, or be subject to close, costly control.

It's a different story with Mathieson's Sodium Chlorite—and its co-product Chlorine Dioxide—the new bleaching agents which do not degrade pulps, fats or fibers, and hence permit safe bleaching to new highs in whiteness.

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Sodium Chlorite Products . . . Chlorine Dioxide
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Sodium Chlorite—a Mathieson development—is a stable chemical which is used directly for many bleaching and oxidizing purposes . . . or used in conjunction with hypochlorite . . . or as a convenient source of the powerful oxidizing agent, Chlorine Dioxide. Details on the many applications are yours for the asking. Write to: Sales Development Department, The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, New York.

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

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P-15

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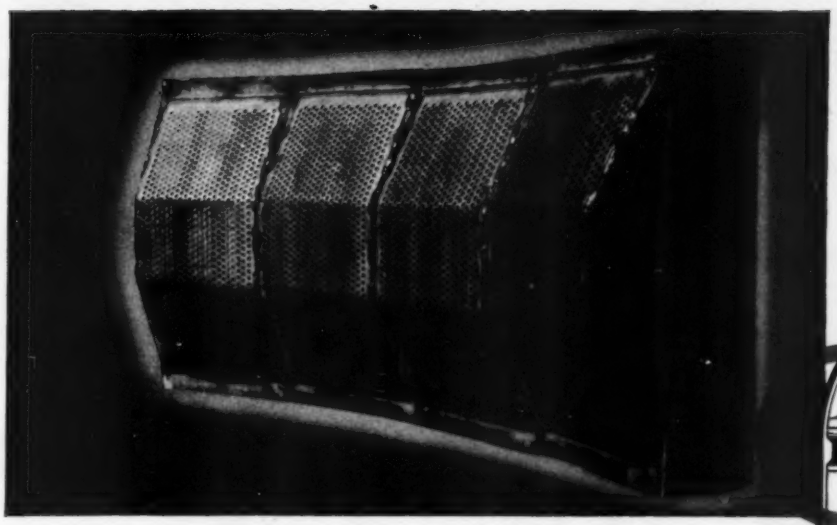
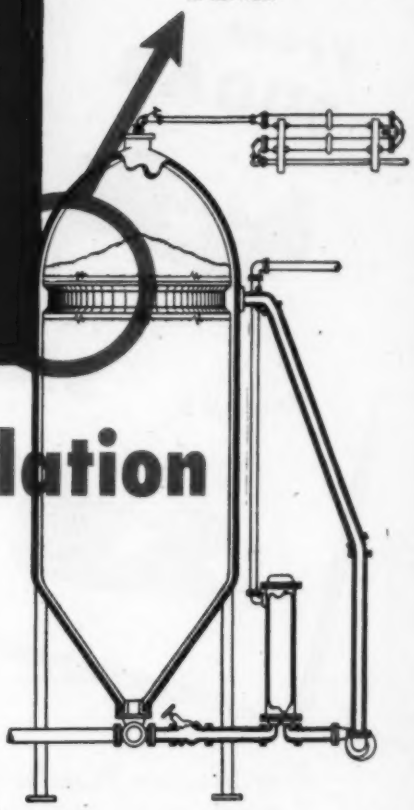


Typical ESCO strainer installation. ESCO strainers built in 1933 are still in service.



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ESCO engineers have the experience and working data necessary for placing the strainer in the digester so that the best results will be obtained, and to work out other problems that arise with each installation. They design strainer systems to the specifications of the pulp mill's own engineers. You are invited to consult them at any time. To get engineering data and other information on *ESCO* stainless steel strainers, see your nearest *ESCO* representative, or fill in and mail the coupon below.

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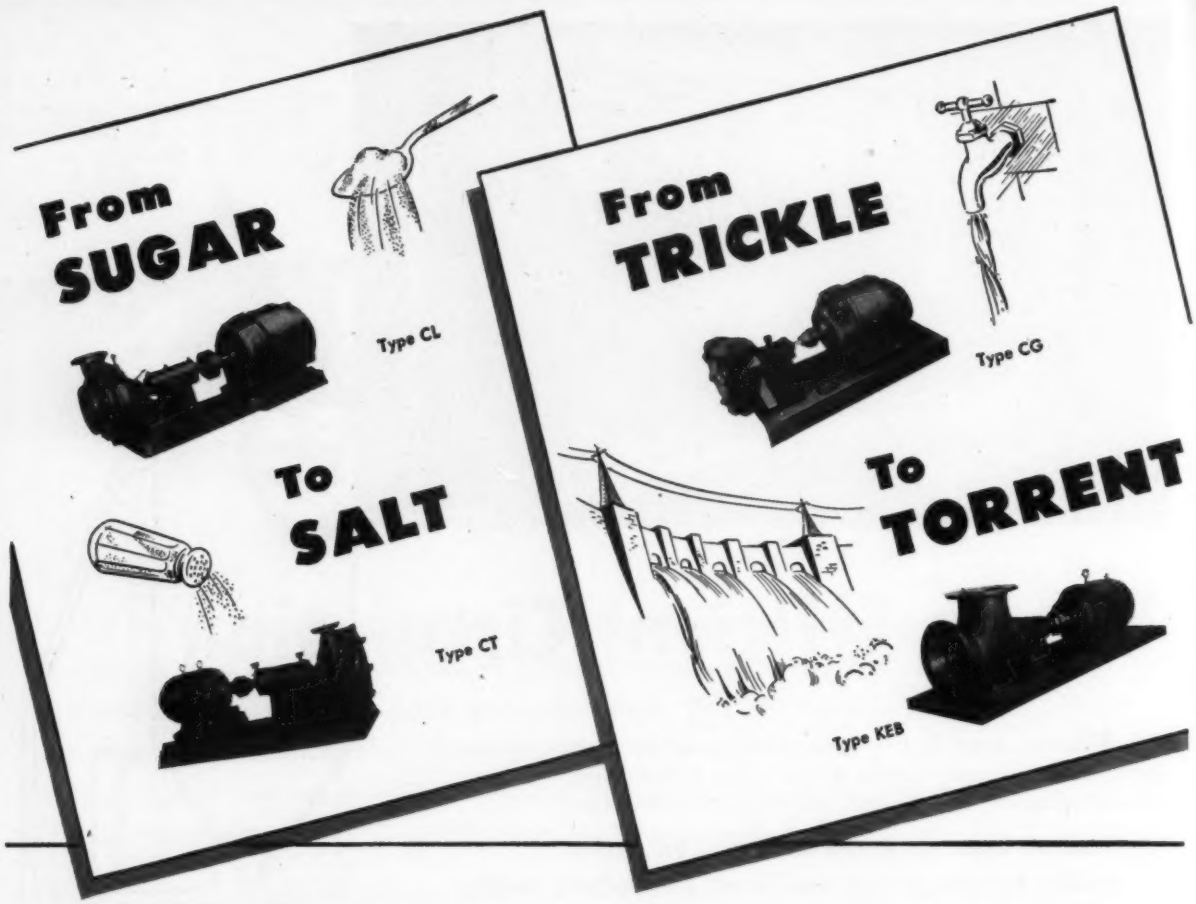

Worthington Standard Centrifugal Pumps serve all processing industries

Whether your pumping problems involve corrosion, abrasion or contamination, or are strictly hydraulic, you'll find efficient, economical, *ready-made* answers in Worthington Centrifugal Pumps.

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Worthington Worthite Pumps, for example, are something extra-special in stainless steel alloys. Developed to handle the widest range of pump-punishing liquids, they are equally resistant to corrosive, low pH sugar syrups and corrosive-abrasive brine slurries at the boiling point.

As for Capacities . . .

Worthington Centrifugal Pumps deliver from 5 to 18,000 gpm, smoothly and steadily at all usual heads and speeds. In short, to all industrial processing—from paper to plastics, from rayon to rubber—Worthington offers more pumps for more jobs, plus the longest experience in the field. For details proving *there's more worth in Worthington*, contact our nearest District Office or *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

WORTHINGTON

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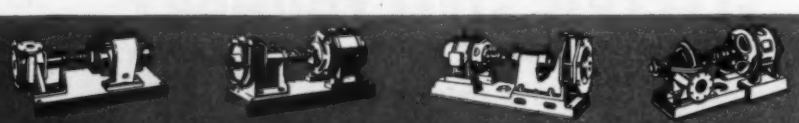

Type CG and CGL. Sizes 6" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE alloy.

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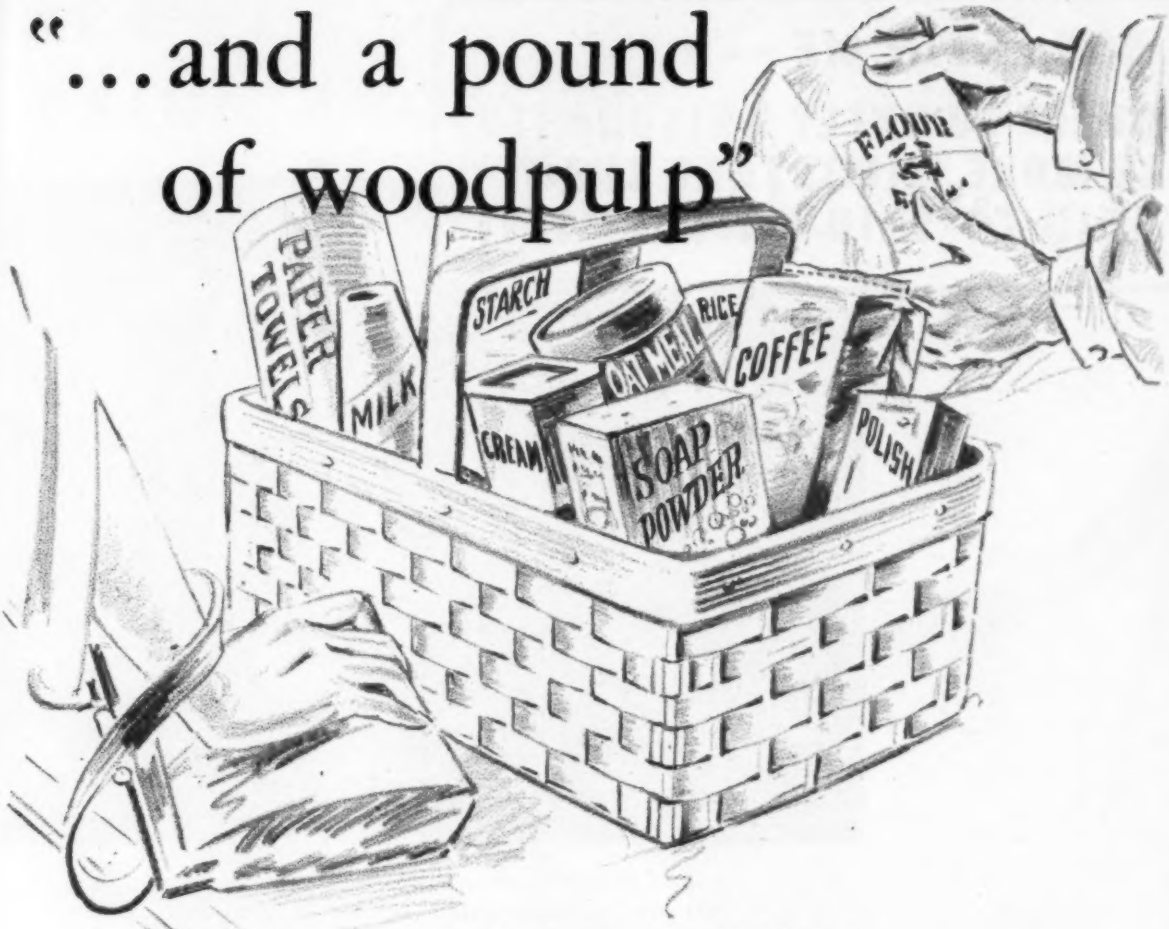
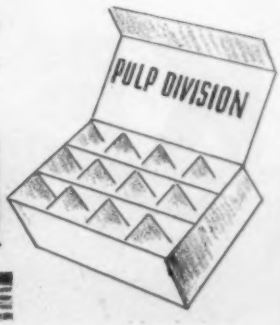
"...and a pound of woodpulp"



Not as absurd a remark as you may think, for it is Mrs. Housewife who ultimately buys and uses most of America's paper and paperboard.

Consider the multiplicity of items which are sold in today's markets—items which are either made of paper or packaged in a product made of woodpulp, molded or fabricated in one of a thousand ways to serve your interests . . . satisfy your needs.

As part of an industry which provides other industries with truly essential services, it is the job of the Pulp Division, Weyerhaeuser Timber Company, to furnish an assured and continuing supply of chemical woodpulp.



WEYERHAEUSER

BILL, WITH ME - - -

SHEET-TO-SHEET UNIFORMITY IS MORE IMPORTANT THAN SKID-TO-SKID UNIFORMITY!

—And this is one of the many superior qualities you find in paperboard surface that is sized with Kelgin*, the algin surface sizing agent. It insures uniform ink absorption, full high gloss ink printing control, provides consistently uniform results.

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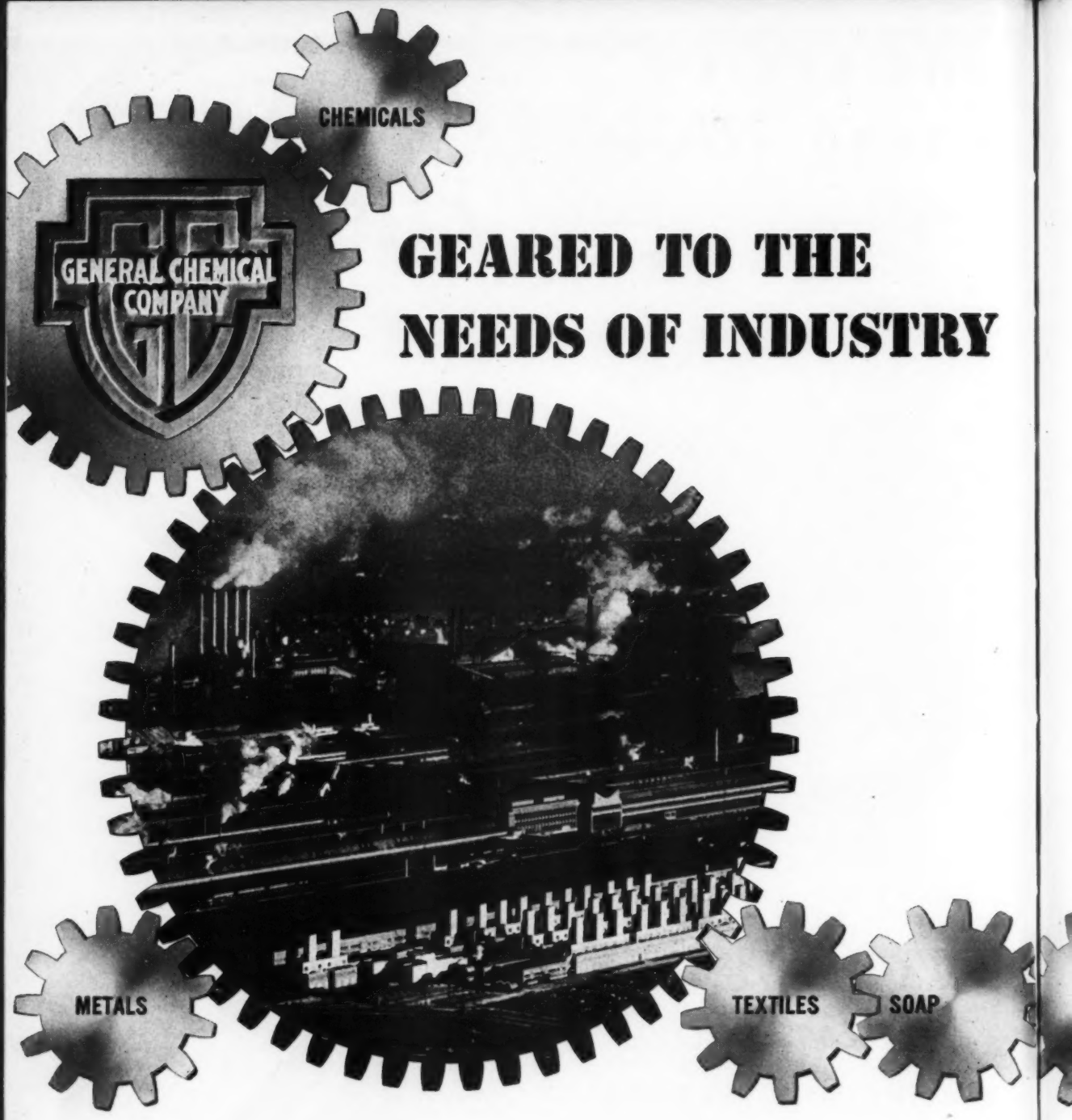

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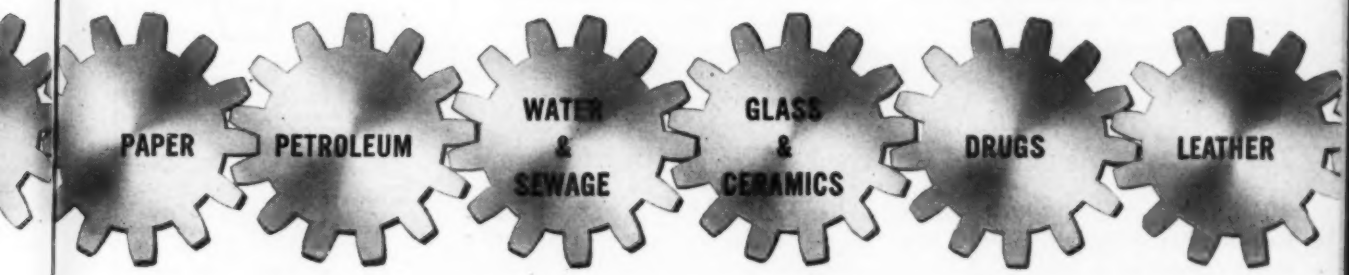

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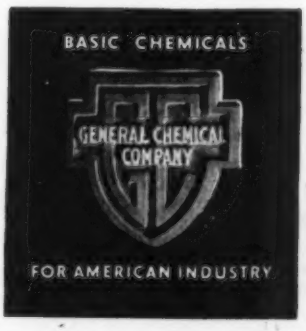


The SIDES of a V-BELT are what GRIP the PULLEY

-Naturally, it's the SIDES that GET the WEAR

Diagram of V-Belt in Sheave-Groove

The story of what wears out a V-Belt—and how a belt can be built to withstand this wear a longer time — is quickly told. Here are the facts:—

Only the sides of a V-Belt touch the pulley. The sides do all the gripping on the pulley. The sides pick up the load. They transmit that load to the belt as a whole. Then, once again, the sides grip the driven pulley and deliver the power to it. And the sides take all the wear against the sheave-groove wall.

This explains why everyone who works around machines has always noticed that the *sidewall* of the *ordinary* V-belt is the part that wears out first!

The CONCAVE SIDE is a GATES PATENT

That's Why the *Patented* CONCAVE SIDE That *REDUCES* Wear on Sidewalls is So *IMPORTANT*

Naturally, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the middle of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belt can possibly give.

The Concave Side is MORE Important NOW Than Ever Before!

Now that Gates *SPECIALIZED* Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—up to 40% *higher horsepower ratings* in some cases—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important NOW than ever before!

Straight Sided V-Belt — Fig. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley — Fig. 1-A

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall — Fig. 2

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley. — Fig. 2-A

No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

4711

Gates

THE MARK OF SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY, DENVER, U. S. A.

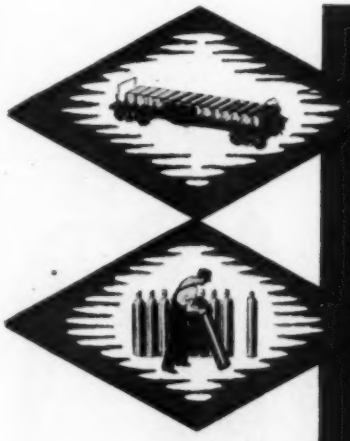
"World's Largest Maker of V-Belts"

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries

DIAMOND *Liquid* CHLORINE

Shipped to you in tank cars,



multi-unit cars, or in

cylinders, to best suit

your requirements

The People Remain Grateful

"for their safety and happiness"

THE PATTERN OF LIFE may change with the passing of time, but the fundamental principles upon which this great country was founded will continue to glow with promise and light up the broad highway of national progress.

One hundred and fifty-eight years ago both houses of congress asked the President to "recommend to the people of the United States a day of public thanksgiving and prayer, to be observed by acknowledging with grateful hearts the many signal favors of Almighty God, especially by affording them an opportunity to establish a form of government for their safety and happiness."

George Washington followed that recommendation, and on October 3, 1789, issued the first presidential thanksgiving proclamation. Through the years, the people of this country have reaped the bounty of the earth and have enjoyed the fruits of man's genius. Through the intermittent periods of chaos caused by greed and avarice—commonly the aftermath of wars—there have remained the foundation of good government and the compassing of right principles.

The expressions in that first thanksgiving proclamation have become the code of sound-thinking, law-abiding citizens of today, and all who live under this beneficence are grateful that the roots of America were planted in the soil of perpetuity.

The medallion shown above depicts private enterprise and its indispensability to the American way of life. It was designed by Rene Chambellan, noted American sculptor, and was presented to industrial leaders at the 45th Annual Congress of American industry in 1940.

TRADE WINDS

PABCO Research Laboratories Completed

▶▶▶ COMPLETION OF the new research laboratory at the Emeryville plant of The Paraffine Companies, Inc., provides the West coast with one of the largest and most completely equipped building material research centers in the world. Extensive additions and general improvement in research facilities have been effected at an expenditure of well over a half-million dollars.

The four-story research building houses several groups of laboratories; a library with a comprehensive collection of technical journals and books; executive offices, and a well-ordered storeroom. Important units include an air-conditioned conductivity room equipped with machinery for testing the resistance of material to heat and cold; an air-conditioned microanalytical room and a weatherometer room which affords an accelerated method of testing the resistance of products to exposure.

In addition to the latest, most up-to-date standard equipment found throughout PABCO's Research Laboratory, special machinery designed to the company's specifications has been installed. Pilot equipment simulating manufacturing equipment has been set up to aid in studying product quality and production methods through actual small scale manufacture.

In the expansion move, The Paraffine Companies, Inc., has more than doubled its staff of scientists and is engaged in a continual search for men with outstanding qualifications. PABCO has attracted a group of chemists and chemical engineers from every section of the United States. The staff members hold degrees from twenty-four American and foreign universities, and they participate in the activities of nineteen different scientific and technical societies.

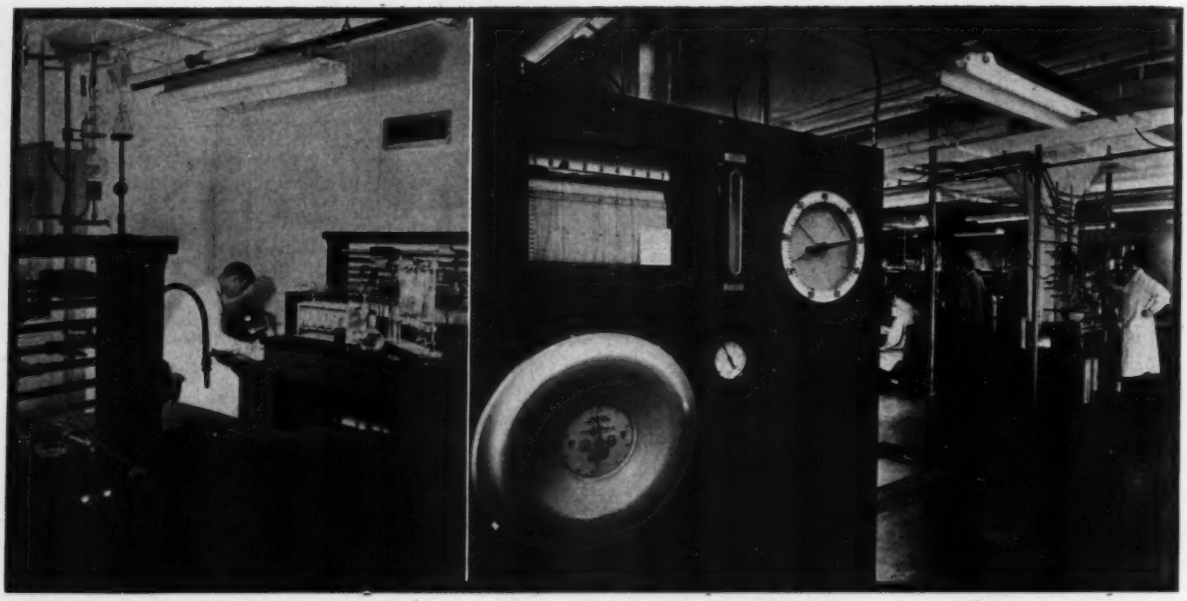
Pabco laboratory equipment for making fibrous sheet materials. In foreground is a beater being operated by the chemist while in the background is equipment for forming fibers into sheet materials

Dr. A. M. Erskine, director of the Research Division, is a graduate of Cornell University and has had extensive academic and industrial research experience. The company retains Dr. Ludwig Rosenstein as consultant and advisor. Dr. Rosenstein, a graduate of the University of California, is nationally recognized as a consultant in petroleum and other fields.

The expanded research department centralizes research for The Paraffine Companies, Inc., at the main plant of the company in Emeryville, California.

"The laboratories will spearhead Paraffine's efforts to produce new and better materials for housing America's families and industries at lower costs," Company President W. H. Lowe declared in a recent statement.

"Development of more attractive, durable and economical materials for housing of the future will come from scientists' test tubes and pilot plant equipment," Mr. Lowe continued. "Through their technical skill, research will develop new and better



LEFT—Pabco's microchemical laboratory where even smaller quantities of material than that used in ordinary chemical laboratory work are used in tests . . . RIGHT—The organic research laboratory, one of the many specialized centers within the Pabco Research Building. Shown on left is instrument panel of equipment for studying the processing of asphalt and pitch

building materials and processes for manufacturing them so that they can be made available to the consumer at constantly lower costs."

"The Paraffine Companies believe that our progressive research program has been our greatest aid in expanding our markets," President Lowe said. "Research has enabled us to compete successfully with other areas despite our high labor and transportation costs."

◆

HOLLINGSWORTH & WHITNEY TO BUILD $1,000,000 WATER TREATMENT PLANT

A construction project amounting to approximately a million dollars has been started by Hollingsworth and Whitney Company to improve the water supply system for its Chickasaw Mills at Mobile, Alabama. The program is an elaboration of work planned in connection with the paper manufacturing plant which was deferred because of the war.

The work is expected to cover a period of from twelve to eighteen months and will provide employment for one hundred or more local craftsmen.

The program involves construction of a modern water treatment plant with a daily output of ten million gallons of water, a new pumping station, and the construction of approximately three and one-half miles of underground steel pipe line to convey the water to the treatment plant and mill.

The water treatment plant, which will be mainly reinforced concrete and steel construction, will include a flocculator-clarifier structure, a rapid sand filter plant with filtered water feeding to a clearwell reservoir, and a three-story chemical building of steel and brick construction. Water for filter sand washing will be supplied from an elevated storage tank. Included in the paper company's program is the construction of an addition to its mill laboratory to provide facilities for carrying on water analyses in connection with operation of the new plant.

The new facilities were designed by Fay, Spofford & Thorndike, of Boston. The Rust Engineering Company, Pittsburgh, the general contractors who built the original plant, will continue as general contractors for this extension.

◆

ST. REGIS PAPER CO. BUYS 82,000 ACRES OF TIMBERLAND IN MAINE

The St. Regis Paper Company, New York, has acquired all outstanding stock of the Ellsworth Forest Products Corporation, of Ellsworth, Maine. The purchase increased St. Regis' timberland holdings in the state of Maine by 82,000 acres and brought the company's total in the United States and Canada to more than 1,700,000 acres.

Ellsworth Forest Products will be operated by St. Regis as a wholly-owned subsidiary. The newly-acquired company, incorporated in 1930, has been using some of its timber for pulpwood, as well as conducting a lumber business. It operates sawmills at Lead Mountain and Waltham, Maine, and a planer mill at Ellsworth Falls. St. Regis will utilize the pulpwood from the new holdings for the manufacture of printing, publication, and converting papers in its mill at Bucksport, Maine.

◆

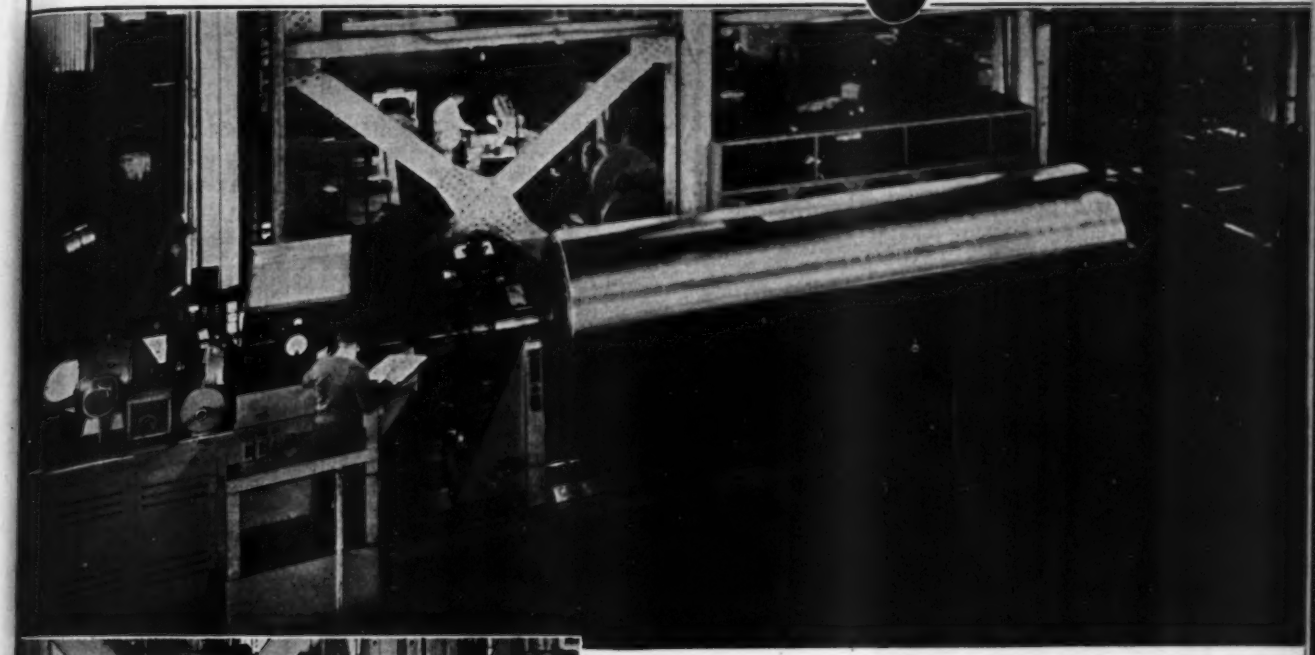
UTILIZATION OF DAMAGED AND FARM-GROWN TIMBER STUDIED BY GOVERNMENT

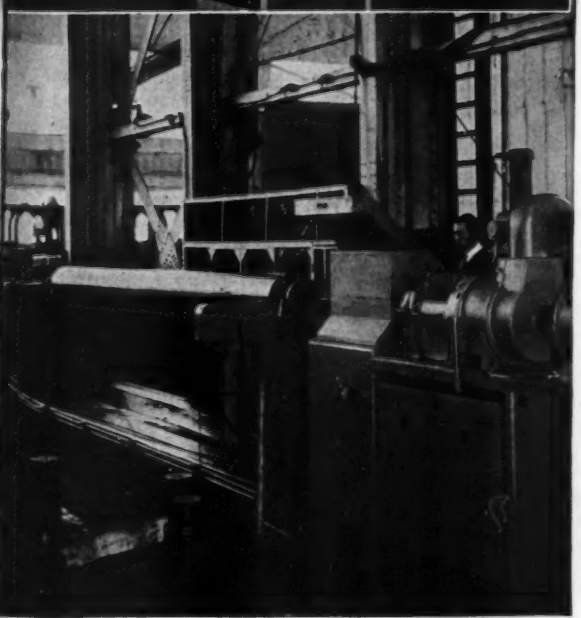
In order to increase utilization of timber in this country, the U. S. Department of Agriculture has announced two research projects under the Research and Marketing Act of 1946 covering the use of farm-grown timber and the salvage of damaged timber.

The development of new and increased uses of farm-grown timber and ways to get better service from such wood products will be investigated by the Forest Service, largely at the Forest Products Laboratory at Madison, Wisconsin. One object of the study is the determination of possibilities for making pulp from farm-grown northern and southern hardwood species.

In the second project, forest pathologists of the Department of Agriculture will seek to determine the rate of decay and the maximum salvage period of budworm-killed spruce and fir in the northeastern states, beetle-killed spruce in Colorado, and fire-damaged timber in California. As spruce budworm damage is recent in the United States, but has occurred annually in Canada since 1935, preliminary studies will be made there,

PAPER · · · America's 6th Industry





LIFTS "CEILING" ON MACHINE SPEEDS

Every rotating part of a Puseyjones Machine—from the smallest gear to the largest roll or drying cylinder—is now balanced electronically to within 1/10,000 of an inch of linear movement.

Here is what this precise balancing means to you—machines now building by Puseyjones for papermaking speeds up to 2,100 feet per minute; vibration-free operation of Puseyjones Machines at such future higher speeds as the Paper Industry may require.

Puseyjones engineers work this electronic "miracle" with the largest and latest type Gisholt Dynetric Balancing Machine. Unbalance vibration is transmitted through an electronic system whence it is amplified for recording. Amount and point of unbalance are determined in a matter of seconds.

This precise balancing is now standard procedure in checking the rotating parts in every Puseyjones Machine. And what a difference it will make in speeds and tonnages. Let us give you full details.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

where the government has laid out plots in which trees are tagged as to time of death. The investigators will thus save several years' time in determining how rapidly trees deteriorate in merchantable value.

◆

NEWSPRINT FROM DE-INKED PULP TO BE MANUFACTURED IN A NEW PLANT AT GARY

Ground has just been broken for the building of a $500,000 plant in Gary, Indiana, to manufacture newsprint from de-inked pulp.

This project has been developed by a new company, the Gary Paper Mills. J. R. Snyder, publisher of the *Gary Post Tribune*, is president. Associated with the company are following newspapers: *Gary Post Tribune*, *Hammond Times*, (Indiana); *Peoria Journal & Star*, *Chicago Journal of Commerce*, *Waukegan News-Sun* (Illinois); *Superior Telegram* (Wisconsin); Beckley (W. Va.) Newspapers; and *Nowadays*, a new magazine not yet published.

The first paper machine has been purchased for a daily production of 50-60 tons per day, but the plant is designed to accommodate a second machine, which it is expected will bring the ultimate capacity of the plant to 125-150 tons.

A former announcement published in this section stated that the first of five plants to use the Sterling process for the manufacture of newsprint would be built in Gary (Cf. P.I. and P.W. July, 1947, p. 502). This report referred to the operations of Buffum and Company, Chicago, which company had at that time obtained an exclusive franchise from the American Industrial Company, Buffalo, to produce newsprint by use of the Sterling Process. Buffum and Company was using the Sterling Process at its two mills, Sheffield Paper Mills, Inc., Saugerties, New York, and Girard Paper Mills, Inc., Girard, Pennsylvania, previous to the announcement of its plans for five new mills. It is now understood that on August 1, the use of the Sterling Process by Buffum and Company was terminated, and license to its operation has passed to the Gary Paper Mills.

◆

UNION BAG'S NEW BOX PLANT NOW IN OPERATION

The new box plant of Union Bag and Paper Corporation, Savannah, Georgia, has gone into partial production. Present for the opening held recently were: R. W. Groves, president of the Savannah Industrial Committee, and a member of the board of Union Bag; Charles J. Musante, executive secretary of the Industrial Committee; and Colonel E. George Butler, who as vice chairman of the Industrial Committee in 1935, negotiated with Union Bag to locate its plant in Savannah.

The new plant is of modern steel and concrete construction and is equipped with modern corrugating and box-making machinery. The board mill of the company, located just across from the box plant, will furnish material for the box plant.

A statement given out by T. T. Dunn, resident manager of the Savannah plant, indicates that additional machinery now in process of manufacture will be installed at an early date.

◆

AMERICAN WRITING PAPER CORP. HOLDS ITS ANNUAL 3-DAY SALES CONFERENCE

The annual three-day sales conference of the American Writing Paper Corporation was held late in October at Holyoke, Massachusetts.

Addresses on various phases of paper manufacturers and merchandising were given by E. C. Reid, vice president in charge of manufacturing; James H. Sweet, vice president in charge of sales; Peter Freedman, comptroller; William J. Norton, treasurer; Chauncey Cooley, advertising manager; and Frederick A. Curtis. John G. McNaught and Sheldon Bradley of the sales staff presided at the sessions.

The conferences closed with a dinner attended by forty-five executives and sales staff members in the Roger Smith hotel.

◆

N. Y. STATE COLLEGE OF FORESTRY INAUGURATES HUMAN RELATIONS COURSE

The first forest school in the nation to inaugurate a supplementary course on "Human Relations in Forestry" is The New York State College of Forestry at Syracuse University, Dr. Joseph S. Illick, dean of the college, has announced.

Dr. Illick stated that he had yet to find a single instance where a forester failed wholly for the lack of technical training, but that in practically all instances of failure it was because of a lack of an understanding of human relations.

During this course, which is for seniors and graduate students, lectures will be given by outstanding economists, specialists in public relations, and foresters.

The first series of lectures covering a period of five weeks will be given by R. Lynn Emerick who was State Forester of Pennsylvania for sixteen years and later was Director of State Public Relations. He voluntarily retired from the Pennsylvania Forest Service in January of this year after forty years in the forestry profession.

◆

ARMSTRONG CORK COMPANY BUILDS NEW FIBERBOARD PLANT AT MACON, GA.

A new fiberboard plant at Macon, Georgia, now under construction for Armstrong Cork Company (Lancaster, Pa.), will add a half million square feet to the daily board capacity of southern mills when it begins operation early next year.

Designed by The Rust Engineering Company to produce "Temlok" from loblolly pine, the new mill includes a production and warehouse area of nearly five and a half acres. This modern production unit was designed to allow expansion of all facilities to accommodate future capacity increases.

The plant is a one-story building with a basement under the pulp mill end to accommodate stock tanks and pumps for the pulping process. A railroad siding has been depressed so that box cars spotted for loading are at the same height as the shipping floor.

The building has structural steel frame, concrete floors, precast concrete roof, and tile walls with steel sash. Maximum overhead room has been provided by the use of roof beams, thus eliminating trusses. Main and mill office areas are air conditioned and have flourescent lighting.

Two sets of grinders will be installed. Each set will consist of two grinders in tandem run by a synchronous motor. Board produced will vary in thickness from ⅜ to one inch. Daily production capacity will be the equivalent of 450,000 square feet of ½ inch board.

Service facilities include a large machine shop and maintenance shop on the main floor and hand operated bridge cranes over all major items of equipment.

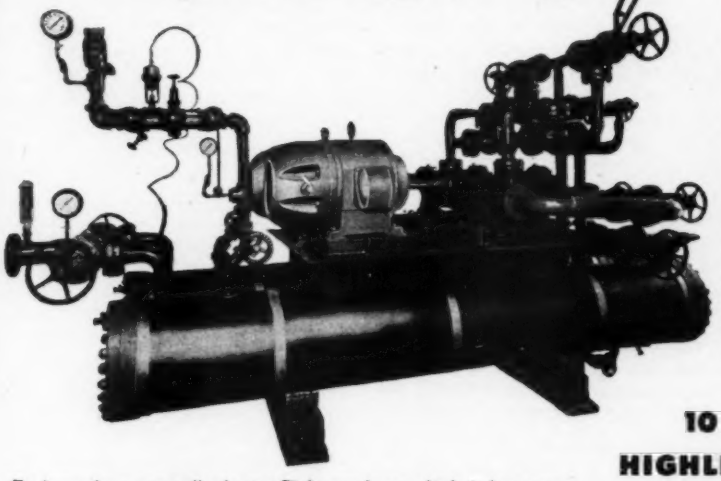
◆

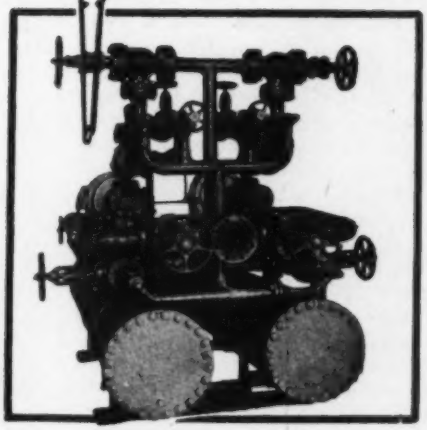
AMERICAN COATING MILLS DIV. ACQUIRES PLANT OF GRAND R. PAPER BOX CO.

The plant of the Grand Rapids Paper Box Company, Grand Rapids, Michigan, has been acquired by American Coating Mills Division of Owens-Illinois Glass Company, Elkhart, Indiana. The transaction became effective November 1.

The American Coating Mills became a division of Owens-Illinois Glass Company on August 1. The general offices at Elkhart have remained as before, and the plant is operated as a sep-

ENCO designed pump sets eliminate fuel-oil preparation troubles in the planning stage





Today when overall plant efficiency is so vital, it is more necessary than ever for you to be sure that your fuel oil pumping and heating system is designed to provide peak performance *to meet your special plant conditions.*

Many years of experience in planning these installations enables ENCO engineers to design the unit that suits your operating conditions best . . . "tailor made" so that every part is integrated to provide you with easier control and longer maintenance-free operation.

ENCO pumping and heating sets are both simple and economical to install, too. They are delivered in a coordinated unit, ready to connect to station piping and run. And every ENCO Fuel Oil Pumping and Heating Unit is completely tested under high pressures before it is shipped to you.

ENCO "tailor made" pump sets are available in full or semi-automatic models with single or duplicate combinations of steam piston, turbine or electric driven rotary, or screw-type pumps. Pumps may be interconnected with one or two straight-tube heaters. Pumping sets with all-welded pipe connections are also available on request.

For further information on ENCO Automatic Fuel Oil Pumping and Heating Sets, write for Bulletin O.B.—37.

10 PLUS FEATURES THAT HIGHLIGHT ENCO'S SUPERIORITY

1. COMPLETELY AUTOMATIC OPERATION is assured by automatic temperature and pressure regulation valves.
2. COORDINATED DESIGN SAVES SPACE. All equipment essential to the preparation of fuel oil for combustion is contained in one compact unit.
3. INDIVIDUALLY DESIGNED to meet the specific needs of the particular power plant in accordance with its exact operating requirements.
4. ALL PARTS VISIBLE AND ACCESSIBLE for easy operation, maintenance and repair.
5. PUMPS AND HEATERS are interconnected to provide maximum flexibility of operation.
6. SAFETY VALVES protect individual parts where required.
7. EASIER MAINTENANCE — LESS SERVICE-TIME FOR CLEANING because straight tube, multi-pass heaters with removable heads are used.
8. PUMPS OPERATE AT MODERATE SPEED. Heaters designed to give the correct viscosity and velocity without fouling.
9. SMOOTHER FLOW OF CLEAN FUEL TO FURNACE. Air chamber for each piston pump prevents pulsations — pressure regulator for rotary pumps. Twin type strainers provided to keep atomizer tips from clogging.
10. CLEANER BOILER ROOM . . . all overflows connected to a common outlet; flanged drip pan catches oil drip.

EC-466

THE ENGINEER COMPANY
75 West Street
New York 6, N. Y.
Canadian Representative: F. J. Rackis, Ltd.
4220 Iberville St., Montreal 34, P.Q.

arate unit. There has been no change in personnel, except that titles have been changed since the company is no longer a corporation. The new titles now are:

R. L. Snideman, general manager of the American Coating Mills Division and vice president and director of Owens-Illinois Glass Company.

N. L. Moyer, plant manager

J. C. Hendricks, general sales manager

H. S. Rish, director of purchases

◆

I.P. CO. ANNOUNCES LARGE PROGRAM FOR 1948 & 1949

A construction program for 1948-1949 has been approved by the board of directors of International Paper Company, which will increase the capacity of its kraft board and paper mills 900 tons and 100 tons per day, respectively.

No new mills will be built, according to announcement by John H. Hinman, president of the company. The additional capacity will be obtained by changes in existing mills, which will involve an expenditure of $25,000,000. According to the announcement, the company plans to meet these expenditures without borrowing any money or issuing any additional capital stock. This construction program is in addition to $22,000,000 previously authorized for 1947, which work is progressing according to schedule.

Also announced by I. P. Company is modernization and expansion in its eight southern mills for 1948-1949. This work, together with improvements in other southern properties and the purchase of additional woodlands, calls for an additional expenditure of $22,000,000.

According to Mr. Hinman, president of the company, one result of this program will be an increase in productive capacity of International's southern kraft mills by 900 tons of kraft board and 100 tons of kraft paper daily, the equivalent of the output of two large kraft mills.

This brings to over $40,000,000 company expenditures of this kind authorized for the period 1947-49 for the South. Large expenditures for normal repair and replacement work, which last year came to over $11,000,000, are not taken into consideration.

All areas where the company has mills in the South will feel this spending program, Mr. Hinman said. The largest amounts will be spent in Panama City, Florida; Bastrop (2 mills) and Springhill, Louisiana; and Camden, Arkansas. Other mills are at Georgetown, South Carolina; Mobile, Alabama; and Moss Point, Mississippi.

NEW PLANT TO MAKE FIRST NEWSPRINT IN INDIA

▶▶▶ IN THE DEEP RECESSES of India a $5,000,000 mill is being erected in Chandni, a small village of fifty huts and a population of 250, situated in the midst of thousands of square miles of virgin malaria-infested forest to manufacture newsprint. The plant is expected to produce 100 tons of newsprint per day when production gets into full swing in 1950.

This first Indian venture into the newsprint manufacturing field has been rendered possible by an almost revolutionary discovery that best quality newsprint could be manufactured from wood pulp obtained from the Indian "broad-leaf" tree, a tropical species found in abundance throughout India. Hitherto it was assumed that good quality newsprint can be manufactured only from the fir or spruce, found in India only up in the inaccessible Himalayas.

The discovery owes itself to the enterprise of a young Indian newspaper publisher, P. N. Nair, who had investigations carried out in a Canadian research laboratory on the "broad-leaf" tree. Canadian engineers have now confirmed that large-scale production from wood pulp obtained from this tree is possible.

This article has been prepared exclusively for *The Paper Industry and Paper World* by D. A. S. Chari, of Universal Trade Press Syndicate.

The plant, National Newsprint and Paper Mills, Limited, will be equipped with the most modern Canadian and American equipment. It has been designed by a well-known Canadian engineering firm and will have in its employ a number of American and Canadian technical advisers.

No newsprint is manufactured in India today. The country imports all its needs, 45,000 tons per year, from abroad, mostly from Canada. India's consumption works out at a meager 0.25 pounds per capita. This low consumption is explained in part by the low literary rate of 13 per cent and by the abysmal poverty of the people. When the vast programs of literacy, which have already been formulated, are put into effect, it is expected that India's consumption of newsprint would rise by 400 per cent in ten years.

Like most other countries, the Indian press is suffering from a great scarcity of newsprint. Most Indian newspapers are restricted to a maximum of eight pages daily and there is a restriction on the bringing out of new journals. This scarcity has acted as a great fillip to the establishment of an indigenous newsprint manufacturing industry.

The establishment of the new plant has been rendered possible by the great interest in the project exhibited by the government of India and by the government of the Central Provinces in whose territory the factory is being erected. The government of the Central Provinces has taken shares of the value of $300,000 out of a total issue of $5,000,000. The rest of the issue has been bought almost completely by Indian private investors.

The Central Provinces government has leased out 375,000 acres of land, have promised to erect a 30,000 kilowatt thermal electric power station near the site of the factory, has undertaken to develop the small railroad station at Chandni and to develop the roads in the area.

Intense spraying of DDT to eradicate the mosquito pest and to render the place safe from malaria has commenced. Hospitals, dairy farms, food centers, and schools will be established in the area. At lumbering camps, landing wharfs, and other centers in the area, small newsprint towns will be built on the most modern lines to ensure decent and healthy housing and living to all the workers and laborers.

The whole area will be linked by radio and telecommunication, installed mainly for use in case of forest fires. A research laboratory will be built adjoining the factory where the properties of Indian wood will be studied by research students from all parts of the country. A special silviculture department will see to the replanting and fresh cultivation of the trees used in the manufacture.

The National Newsprint and Paper Mills claims that by using the indigenous "broad-leaf" tree, newsprint can be manufactured at a cost much less than that of the Canadian product and be sold at 60 per cent of the price of the imported newsprint. The company has on its board of directors a number of well-known Indian businessmen.

The erection of a factory with a similar capacity is being planned in another Indian province, Bihar, by one of India's richest financiers, but this is still in the blueprint stage.

◆

▶▶▶ A PERMIT FOR the erection of a $450,000 factory has been granted to Fibreboard Products, Inc. (San Francisco), a subsidiary of the Crown Zellerbach Corporation. It is expected the factory will be finished by March 1.

the Crane to Plan on FOR YOUR MILL!

Three Northwests unloading pulpwood for the Berst-Forster-Dixfield Co. at Ogdensburg, N. Y.

1. Its uses are not confined to the pulpyard. It goes anywhere. Handles pulp, rolls, bales, boxes, crates, bulk materials and coal. It operates alongside the pond or on the loading dock. Because it is not confined to tracks it doubles your operating range and the storage area covered in comparison with locomotive equipment.

2. Simplicity of design and exclusive operating advantages make Northwest the outstanding Crawler Crane for paper mill service. Look at the Deck—few gears, only two main shafts. All high-speed shafts on ball or roller bearings. "Feather-Touch" Clutch Control makes operation easy and eliminates any danger of shutdown due to control failure. Worm Gear Boom Hoist gives smooth booming action with power up or down. Uniform Pressure Swing Clutches take the grabs and jerks out of swinging and reduce adjustments.

The Deck of a Northwest. Note the simplicity. Few gears and shafts make maintenance easy and keep operating costs down.

Here's a Crane that can be kept busy cutting costs all day. Ask for the complete story and plan to cut your handling costs.

NORTHWEST ENGINEERING COMPANY
1507 Field Bldg., 135 South LaSalle St., Chicago 3, Illinois

NORTHWEST

The Crane that goes Anywhere!

4 to 44 tons

NEW HOTEL FOR PACIFIC MILLS EMPLOYEES IS THE FOURTH LARGEST IN B. C.

The fourth largest hotel in British Columbia recently was opened by Pacific Mills, Limited, Ocean Falls. The final dismantling of the company's original hotel was completed on July 29, 1946, and on that day construction work on the new one was begun.

Exactly one year and two days after work was started, elaborate ceremonies were held and the building officially opened by the Hon. E. T. Kenney, B.C. Minister of Lands and Forests. At that time, the hotel was christened *Martin Inn*, so named in memory of the late Archie B. Martin, the first general manager of the plant at Ocean Falls, and president of Pacific Mills from 1918 to 1944. Also on that occasion a memorial portrait of the late Mr. Martin was unveiled (See illustration).

This fine hotel cost approximately one million dollars. It was built expressly for single employees of the company (it will accommodate about 350), and it also will serve as a social center for the community.

The accommodations of this hotel include single and double rooms, a spacious, luxuriously furnished lounge; a covered patio for summer; recreation rooms; a ballroom; banquet hall; tavern; beauty shop and barber shop. There are two dining rooms and a cafeteria. The kitchen has been equipped with the most modern equipment available; it is insulated and air conditioned.

The building is six stories high and is of completely fireproof monolithic concrete construction.

Ocean Falls is a spectacularly beautiful spot—there are no highways or railroads; it may be reached only from the sea or by air. And the company—Pacific Mills, Limited—has the distinction of being most northerly located paper mill on the American continent. The Pacific Mills company has plans for further modernization of its townsite.

Martin Inn, new residential hotel for employees just opened by Pacific Mills

◆

FINANCIAL

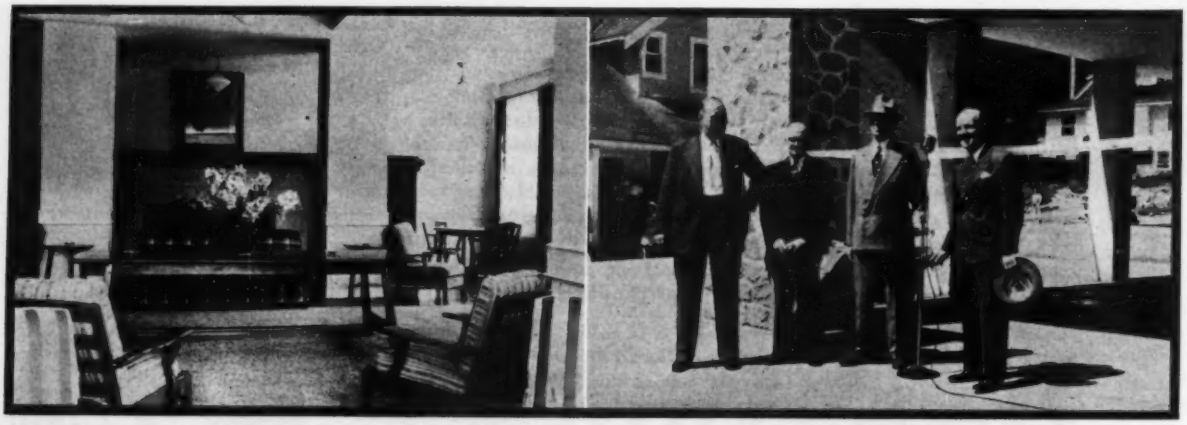
▶▶▶ PAPER MILL SECURITIES took a definite upward turn during the month after some weeks of bearish sentiment, and even the problems of European and American co-operation have not served to more than temporarily check an upward movement.

American Writing Paper Corporation—Net income for three months ended September 30 was $92,245, as against $42,306 a year ago; net income for nine months was $465,873 as compared with $164,365 a year ago.

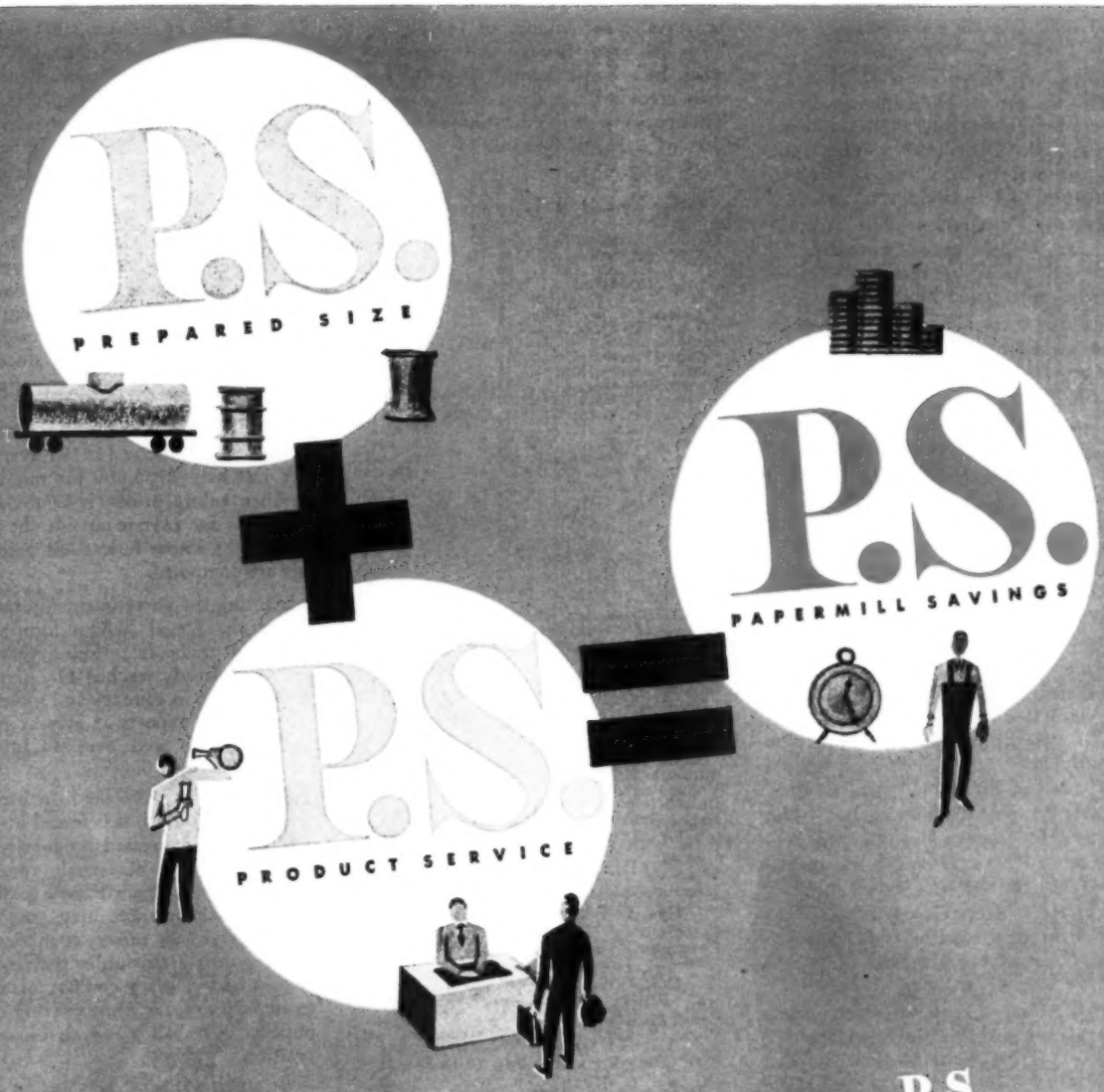
Certain-teed Products Corporation—Net income for nine months ended September 30 was $4,450,957 as against $2,759,528 for the same period in 1946.

Champion Paper & Fibre Company, Ltd.—Net income for sixteen weeks ended August 17 was $1,678,591 after deductions for taxes, appropriations for possible losses by revaluation of inventories and other reserves for extraordinary losses for abandonment of property and excess costs of replacements. This compares with $1,491,534 in the same period of 1946 when these reserves were not set aside.

Chesapeake Corporation of Virginia—Net income for forty weeks ended October 5 was $2,559,183 as against



LEFT—View of spacious lounge of Martin Inn, showing the Memorial portrait and inscription honoring the late Archie B. Martin, who was president of the company from 1918 to 1944 . . . RIGHT—At the opening of Martin Inn, were: (L to R) Paul E. Cooper, president of Pacific Mills Ltd.; The Hon. E. T. Kenney, B. C. Minister of Lands and Forests (who declared the hotel officially open); Louis Bloch, chairman of the board, Pacific Mills, Ltd.; and C. W. E. Locke, Pacific Mills resident manager at Ocean Falls



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$1,010,809 for the same period a year ago.

Container Corporation of America—Net income for three months ended September 30 was $2,337,973 as compared with $2,110,557 a year ago; net for nine months was $8,002,641 as against $4,803,108 a year ago.

Eastern Corporation—Net earnings for nine months ended September 30 were $1,123,114 as against $487,942 for the same period in 1946.

Robert Gair Company, Inc.—Net income for nine months ended September 30 was $4,340,643 as against $1,728,191 a year ago.

Masonite Corporation—Net income for the fiscal year ended August 31 was $4,381,142 as against $2,203,439 a year ago.

The Mead Corporation—Net income for sixteen weeks ended October 5 was $1,355,781 as against $867,840 a year ago; net for forty weeks was $3,821,439 as against $2,143,958 a year ago.

National Gypsum Company—Net profit for the quarter ended September 30 was $1,210,314 as against $1,114,824 a year ago; net profit for nine months was $3,741,760 as compared with $2,842,042 a year ago.

The Paraffine Companies, Inc.—Net income for three months ended September 30 was $809,518 as against $634,940 for the same period in 1946.

St. Regis Paper Company—Net income for nine months ended September 30 was $11,055,144 as against $3,775,622 a year ago.

Scott Paper Company—Net income for nine months ended September 27 was $1,876,874 as compared with $1,160,594 for the same period in 1946.

The Sorg Paper Company—Net income for six months ended June 30 was $743,922 as compared with $167,106 a year ago.

Sutherland Paper Company—Net income for nine months ended September 30 was $1,754,610 as against $1,144,762 a year ago.

Union Bag & Paper Corporation—Net earnings for nine months ended September 30 were $8,787,425 as compared with $3,643,599 a year ago.

Paper Mill Corporate Changes

Eastern Corporation—A serial loan of $2,000,000 maturing October 1, 1948, to October 1, 1952, at 2 per cent has been arranged for the refunding of the company's outstanding 3¾ per cent first mortgage bonds.

Gaylord Container Corporation—At the close of business October 14, 1947, the company had redeemed all of its outstanding sinking fund debentures to the amount of $4,400,000 with its own funds. All preferred stock had been redeemed or converted into common stock as of that date. The company's capitalization now consists of 2,338,305 shares of common stock only.

New York Stock Exchange—Stocks

	Closing Prices Oct. 27	Sept. 25
A.P.W. Products	*5⅝-5⅞	4¼
Celotex	28	28¾
Same Preferred	*20¼-20¾	20½
Certain-teed Products	18¾	18⅞
Champion P & F Co.	24	23¼
Same Preferred	106	*106-107
Container Corp.	44⅛	41¾
Same Preferred	100	*100-100¾
Cont. Diamond	11⅞	10¾
Crown Zellerbach	32½	30½
Same Preferred	102	105
Same $4 Preferred	*121⅜-126	*115-118
Dixie Vortex	40	*37½-39
Same "A"	54¼	62½
Robert Gair Co.	10¼	8¾
Same Preferred	*19¾-20¼	*19⅜-20
Gaylord Container	20¾	20⅛
International Paper	57½	51⅜
Same Preferred	100¾	105¾
Kimberly-Clark	24⅛	23⅝
Same Preferred	109	109½
McAndrews & Forbes	*38¼-39½	*36½-37
Marathon	22¼	22¾
Masonite	56	*50⅛-50½
Mead Corp.	23¼	20¼
Same Preferred	92	94½
Same 2nd Preferred	*38¼-50½	45⅞
National Container	14⅞	15⅝
Paraffine Cos.	*71-73	69
Same Preferred	*106½-109	*106½-109
Rayonier, Inc.	28⅜	27¼
Same Preferred	36⅞	*37¼-37⅝
Scott Paper	46½	*46-46¾
Same Preferred	*98-98½	*102-102¾
St. Regis	11¾	10
Same Preferred	92	....
Sutherland Paper	*41-42½	*38½-39
Union Bag & Paper	35	33⅛
United Paperboard	16	16¾
U. S. Gypsum	104½	98
Same Preferred	*180-184	187
U. S. Wall Paper	7	6⅞
Same Preferred	42⅛	*42-45
West Va. P. & P. Co.	45¼	42½
Same Preferred	111¼	112

New York Stock Exchange—Bonds

Celotex 3½%	....	103⅜
Champion P. & F. Co., 3%	....	103⅜

New York Curb Exchange—Stocks

Am. Writing	10⅜	....
Great Northern	46½	44
Taggart	10½	9⅞

*Closing Bid and Asked Prices.

BRITISH PAPER NOTES (September, 1947)

▶▶▶ Despite the fact that all licensing for the present period is practically completed and the British paper trade is anxiously waiting a directive from the government concerning the new License Period, no news has yet been received. Consequently, papermakers, merchants, and consumers are left speculating and cannot under these conditions make any arrangements for the future. Generally it is accepted that greater quantities will be diverted to exports and less be available for home consumption, but just how much and how far the home trade will be affected cannot be foreseen.

The only item of concrete news is the setting of an export target for the paper trade to be reached by mid 1948 and the end of 1948. This target is, however, so complicated that nobody outside the Government appears to know, at least at present, what will be required. The complication arises over the fact that the basis selected covers the last quarter of 1946 and as far as the paper trade is concerned refers to "Paper and Paper Goods." What is meant by "Paper Goods" is not clear as stationery and books, for example, are set separate targets. However, the target stated is £1,450,000 per month by mid 1948 and £1,750,000 by the end of 1948. These two figures are shown as representing 116 per cent and 140 per cent of 1938. Also, since prices have been advancing steadily since the end of 1947, these respective figures will have to be stepped up accordingly. But as the whole of the exports of the paper trade in prewar (1938) averaged only just over £500,000 per month at the then ruling prices, it is obviously impossible for anyone outside the government to know how these percentages are composed.

Ignoring the government figures and taking the actual known figures for the paper trade, it is found that the trade has already reached 116 per cent of 1946 both in tonnage and monetary values. Paper exports at present prices are producing well over £1,500,000 per month.

While the general need to increase exports is admitted, it is feared in some quarters that increased production for exports may not necessarily result in an upswing in exports owing to the fact that the market may no longer be available. So many countries are turning their attention in the same direction and if every country attempts to step up exports while cutting down imports, we shall reach an impossible position.

In anticipation of this cut in home consumption the National Association of Paper Merchants have issued a request, through the trade press, for their customers to state the purpose for which they require supplies of paper. It is suggested that first consideration will be given to all orders which are required for export and in the case of packing and wrapping papers, priority will be given for the necessary wrapping of food stuffs. Printing and writing papers will be supplied "for requirements which are essential to commerce for the effective trading activities of the country". Whether consumers will consent to this unofficial form of control remains to be seen.

It is noted incidentally by the Board of Trade returns that although there was a decline in exports during August compared with the previous month, the total exports for the first eight months of this year exceeded that of 1947, the total for the eight months being 74,559 tons or 63 per cent of

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1938. While writing papers are in advance of prewar, newsprint exports are only 2,231 tons compared with 37,521 tons pre-war. The most conspicuous item on the export side is coated papers which have reached 9,038 tons representing 182 per cent of 1938.

Against these figures and contrary to the government's present outlook, imports of paper and boards so far this year, 341,407 tons, are twice as much as for the same period of last year but only 50 per cent of prewar. It is noted that the receipts from Norway, Sweden and Finland are much higher than they were last year. Papermaking materials are being received at the rate of 54 per cent of prewar and among these imports are 36 tons from Soviet Russia, the first material imports from that country since the end of the war. Incidentally, no less than 14,490 tons of materials have been received from the United States, which is nearly three times the quantity received last year. This figure is however still well below the 1938 rate.

Although exports of newsprint are low, the receipts of this quality of paper are higher than last year by over 40,000 tons, the total to the end of August being 108,049 tons. Imports from Sweden, incidentally, have reached only 2,208 tons for the first half of this year although Swedish newsprint exports for January-June 1948 are nearly up to prewar, the respective totals to all countries being 64,817 and 77,965 tons. The former figure is almost 50 per cent above last year.

In view of the higher imports of newsprint into Great Britain and the continued restrictions on the number of pages allowed to each newspaper, it is understandable that protests are still being received by the government. The latest body to add their voice is the Institute of Journalists. Newspaper proprietors are concerned over the constantly increasing costs of newspaper production and are stated to have under review the possibility of increasing prices, but against this is the factor that the public is not now so ready to respond to higher prices.

Total newsprint supplies available during the first half of this year is given as 379,000 tons, which is slightly lower than last year and 32 per cent of prewar. Stocks at the end of June are stated to have been 140,400 tons, 13,000 tons higher than at the end of the previous month, and concurrent with this position in Great Britain, news has been received that New Zealand papers are to be cut in size. This cut will represent a net loss to the Canadian and Newfoundland producers of just over 10,000 tons.

The new multiwall paper bag plant of the St. Regis Paper Company (Canada) Ltd. at Vancouver, British Columbia, which has a production capacity three times that of the old plant in that city, was completed recently

NEW $450,000 MULTIWALL BAG PLANT AT VANCOUVER COMPLETED BY ST. REGIS

Completion of a new $450,000 multiwall paper bag plant at Vancouver, British Columbia, by the St. Regis Paper Company (Canada) Ltd., marks another milestone in the organization's long-range plan for plant expansion and modernization, according to Thomas H. Cosford, vice president.

Mr. Cosford pointed out that the new plant, with an annual capacity three times that of the former Vancouver plant, was built with the long-term view of serving industry on the West coast and, in addition, meeting the increased demand for paper bags for the Canadian export trade.

The Vancouver plant, together with the recently-expanded facilities at Dryden, Ontario and Three Rivers, Quebec, will enable the St. Regis Paper Company (Canada) Ltd. to develop a capacity of 225,000,000 bags annually.

These rugged containers each day carry millions of pounds of goods. If the 225,000,000-bag-a-year capacity of the three St. Regis plants in Canada is expressed in terms of weight of contents, then multiwalls from these plants can carry 18,000,000,000 pounds of various commodities a year. Taking the 80-pound paper bag as an average size, this means that each working day of the year enough paper bags will be produced in the three plants to carry 50,000,000 pounds of Canadian products throughout the Dominion and overseas.

The Vancouver plant, embodying the latest features in modern industrial design, has 60,000 square feet of floor space and is equipped with two tubers and auxiliary equipment, one Schmutz 72-inch four-color press, one dipping tank, one 72-inch slitter, and rewind unit.

The new plant also has a modern substation equipped with an enclosed type switchboard. Fluorescent lighting is used throughout the plant. Traffic facilities for loading four railroad cars at car floor level are provided. The Canadian Pacific Railway and the B.C. Electric Company will service the plant.

Every precaution has been taken in the plant to contribute to worker welfare, efficiency and safety. All painting, done to the specifications of industrial engineers, incorporates the best practice of modern color dynamics. Facilities include a cafeteria and lunchroom, special first aid and rest rooms, and modern washrooms and locker rooms.

◆

STATISTICAL QUALITY CONTROL COURSES ARE REVISED BY INSTITUTE

Three years ago a statistical group was set up at The Institute of Paper Chemistry and now a full teaching program in statistical method is effective. There are two courses in the subject. Such instruction will be supplemented, of course, by more informal experience in the same direction.

The first year course is concerned particularly with the rationale of statistical method. An attempt is being made to give the feeling of statistical argument by considering in some detail four groups of statistical operations. First, there is a group of lectures centered on the study of variability, wherein the analysis of variance will be studied in some detail;

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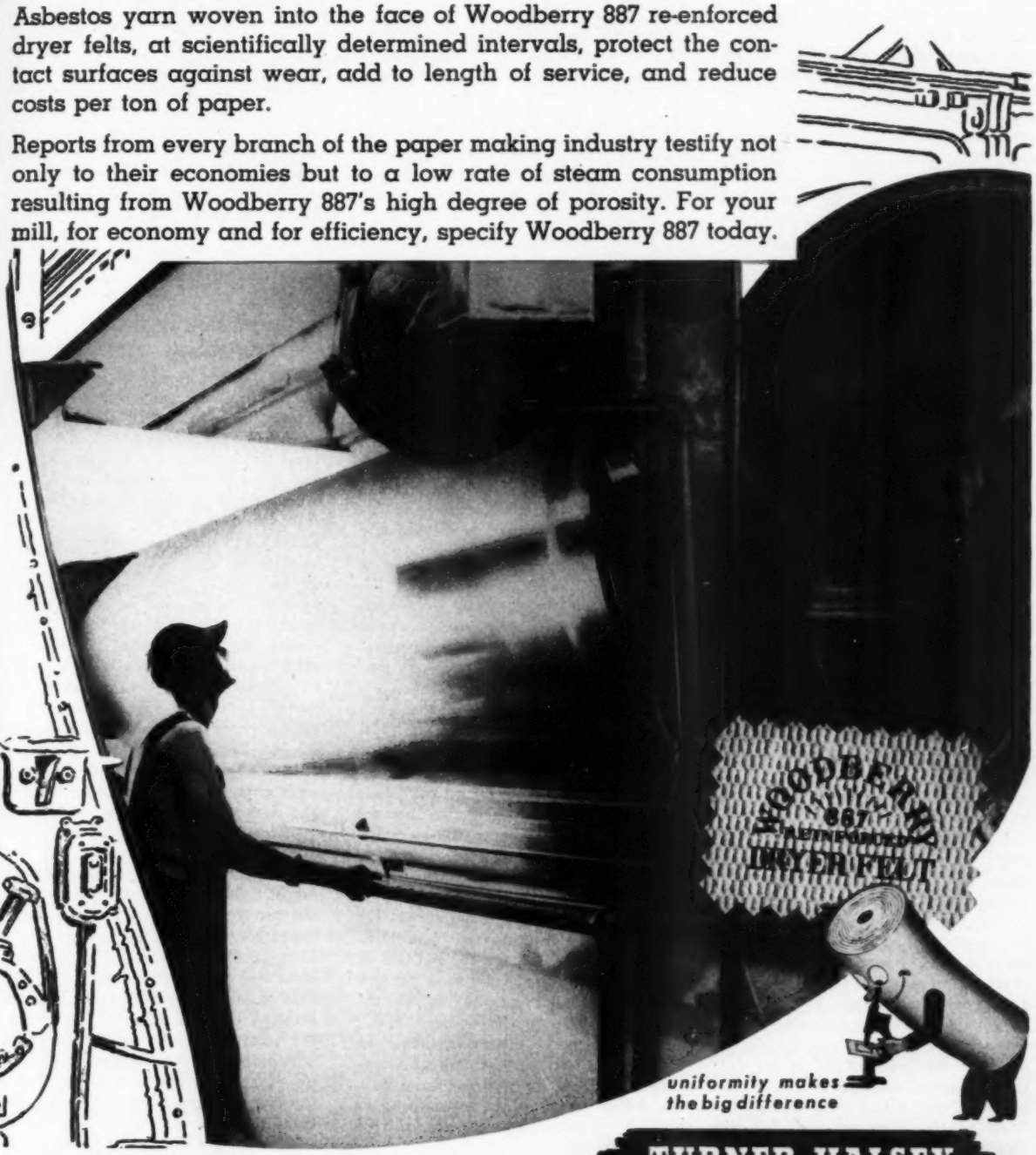
Leading paper mills throughout the country are experiencing important savings in their dryer felt costs with Woodberry 887.

Asbestos yarn woven into the face of Woodberry 887 re-enforced dryer felts, at scientifically determined intervals, protect the contact surfaces against wear, add to length of service, and reduce costs per ton of paper.

Reports from every branch of the paper making industry testify not only to their economies but to a low rate of steam consumption resulting from Woodberry 887's high degree of porosity. For your mill, for economy and for efficiency, specify Woodberry 887 today.



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the group will conclude with a consideration of process control methods of the type developed by W. A. Shewhart. The second group deals with the fitting of functions, linear and curvilinear, with single and multiple dependency; the subject of correlation is considered simultaneously. A third group deals with the theory of sampling and will stress particularly the question of economy of operations. The concluding series deals with a discussion of the design of experiments and the analysis of experimental results. The treatment throughout the series of lectures will derive the necessary conclusions in most cases from first principles, and thus stress the fundamentals of statistical thinking. The over-all aim will be to give the students an idea of the possibilities and, perhaps of more importance, the limitations of statistical procedures. Wherever possible, it is planned that the examples and practical work will deal with problems directly related to the industry.

The third year course is concerned with facility in the application of statistical techniques in experimental problem. The treatment is of a more recognize the statistical elements of his problem. The treatment is a more informal type and resembles the conferences that are normally held among technical workers. The instructor meets the students and discusses the treatment of quantitative problems as they arise. So far as possible, the problems are to be raised and solved by the students. These problems may arise in connection with the student's own research or from his practical experience in the industry. To supplement the very practical nature of this course, it is necessary to introduce certain topics of a more advanced nature in order to round out the student's knowledge and experience in the field. This course, it is hoped, will develop in background with the years; perhaps it will help to create the literature of statistical application to problems of papermaking.

The statistical program of the Institute of Paper Chemistry is under the direction of Dr. Geoffrey Beall. Dr. Beall joined the Institute staff three years ago, when he came from the Canadian Dominion Department of Agriculture where he had been employed for many years in statistical analysis. His formal training in this specialty was obtained at the University College, London, where he studied under both Karl Pearson and R. S. Fisher. This college has attained international recognition for the development of a number of the powerful statistical tools now available.

NEWS ABOUT NEWSPRINT AND NEW PROJECTS

Newsprint problems have been given a first hand study by Congressman Brown and his special committee investigating the newsprint question with visits to Canada, tours of the mills and appearances before domestic publishers.

The net result of the hearings may be summarized as follows:

Congressman Brown foresees a determined effort by this country to press the construction of newsprint mills in Alaska if Canadian prices rise.

The Canadian retort is that such construction subsidized by the United States is a tax charge against American taxpayers to subsidize a domestic newspaper printing industry by providing raw material at a price which commercial operations do not justify.

There was recognition of the fact that newsprint mills could readily raise prices to any figure they desired because of the shortage, and that the shortage is such that spot shipments are being sold at up to $200 per ton, while the Canadian mills have held the price to a $90 base.

Small publishers have complained that the metropolitan publications have been given the bulk of the available paper, and not allowed to share pro rata in the available supply.

The efforts of the United States Department of Justice to bring representatives of Canadian producers into the New York grand jury investigation of alleged violations of the Anti-Trust Act were criticized by Mr. Brown in public addresses.

While Congressman Brown and his committee are investigating the newsprint problem, other moves by the industry itself to meet the situation are under way. Following the plans of the Forest service to open Alaska forests to newsprint mills, a group of large eastern newspaper publishers has been holding meetings in New York to discuss proposals for the erection of a mill to produce 1,000 tons per day in the Bay of Fundy region, on the Canadian side of the border. F. C. Bagley formerly general manager of the Maine Seaboard Company, now owned by St. Regis Paper Company, is a key figure in the new proposals which involve the expenditure of $65,000,000.

The government of the Province of New Brunswick has indicated its support of the proposals. Under a financing plan now being considered, several large publishers would subscribe $35,000,000 of the stock—the other $30,000,000 to be raised by a bond issue.

ST. JOSEPH'S COLLEGE OPENS ANNUAL EVENING SCHOOL OF PAPERMAKING

For the fifth year, St. Joseph's College, Philadelphia, is offering courses to teach the fundamentals of paper manufacture. Registration and opening session of The Evening School of Papermaking began October 13, and classes will meet each Monday and Friday evening.

Planned and taught by experienced papermakers, the course of instruction will cover the theory and practice of papermaking and paper converting. Also specific lectures pertaining to pulp preparation, paper chemistry, operation of process machinery, paper sizing, paper coating, and printing processes and printing inks will be given.

◆

CASE ON JAP. TISSUE RATE ABANDONED AFTER 15 YEARS

The manner in which cases drag on for years in the United States Customs Courts is exemplified by the ending of a conflict over the classification of Japanese tissue paper which began fifteen years ago. In 1932 a shipment of Japanese tissue at Los Angeles was classified as tissue paper at 6 cents per pound and 15 per cent but was claimed to be dutiable at 5 cents per pound and 15 per cent as filter paper, inasmuch as it was to be used in coffeemaking machines. The case was taken to the courts, and meanwhile hundreds of other similar shipments were brought to this country at various ports. Importers protested in each instance against the levy of the higher rate. The Import Committee of the American Paper Industry has records of 358 such shipments which have been pending in the courts from 1932 to 1941 when Japanese shipments were halted by the war.

Now, however, the importer of the original shipment has decided to fight the matter no further and has abandoned his protest. It is expected that a large number of the other pending cases will be similarly abandoned. This case, according to Warren B. Bullock, manager of the Committee, is a striking example of the persistence with which the Import Committee follows up every case which may involve a question of proper protection for the domestic industry.

Scratch board, a material used for printing overlays, has been classified as coated paperboard at $14.50 per ton, but not less than 15 per cent or more than 30 per cent.

English strips of paper one inch wide, metal coated for candy wrapping have been classified for duty at 5 cents

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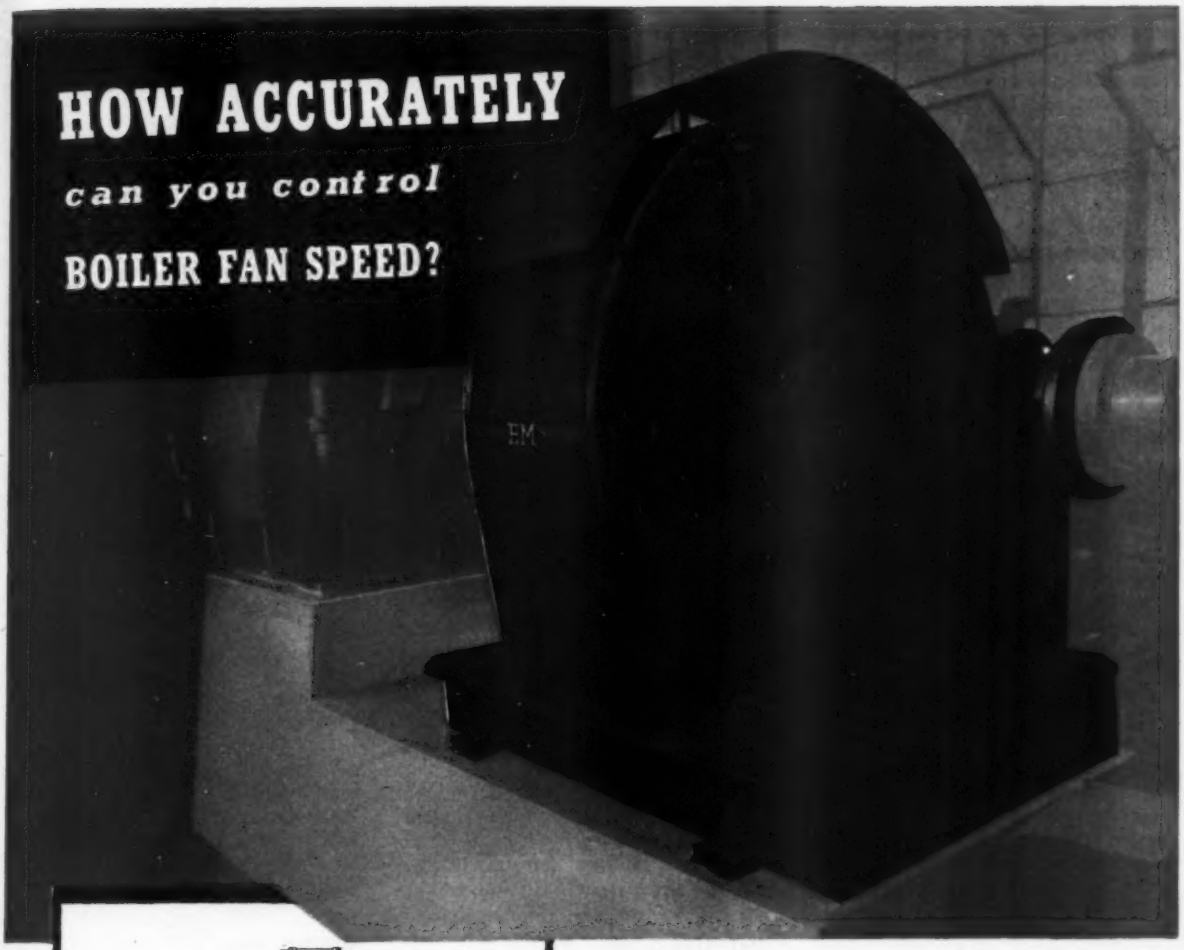

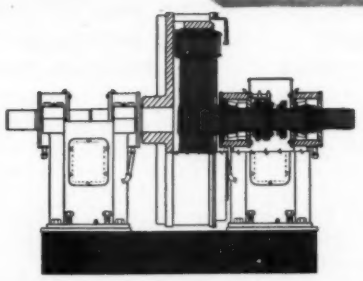

The new Form MD-1 Magnetic Drive is composed of two simple overhung rotating parts without mechanical interconnection. Torque is transmitted electromagnetically between a RING and a MAGNET. A constant-speed motor drives the RING. Rotating within the RING is a MAGNET coupled to the fan shaft. Speed of the MAGNET may be controlled by the Regutron, automatic electronic controller, that adjusts direct-current excitation to MAGNET poles.

AT the Sorg Paper Company, Middletown, Ohio, accuracy *within 1%* is achieved with their recently installed E-M Magnetic Drive. This accuracy of speed control makes possible greater precision in the automatic regulation of mechanical draft under varying steam loads . . . explains why the E-M Magnetic Drive was selected for Sorg's modernization program.

Whenever power plants are modernized, the quick response and the accuracy of adjustable-speed Magnetic Drive assures efficient control of air when steam load varies. Magnetic Drive provides microstep control over a wide range with quick response to change of fan output. It is simple, clean, self-cooling and quiet.

E-M engineers, backed by 50 years of specialized experience in large power apparatus, developed Magnetic Drive and have steadily improved it for maximum dependability. It is the modern method of providing adjustable speed for boiler draft fans.

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Precise, Wide-Range
ADJUSTABLE-SPEED
Magnetic **DRIVE**

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per pound and 20 per cent as manufactures of waxed paper. The importer claims that the proper rate is 5 cents per pound and 15 per cent as metal coated paper, 3 cents per pound and 15 per cent as waxed paper, or 30 per cent as paper not specially provided for.

◆

NEKOOSA-EDWARDS FILTER PLANT BEGINS OPERATION

In order that bleached kraft pulp of maximum brightness may be produced when the new Nekoosa bleach plant goes into operation, the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, has constructed a modern gravity type filter plant at the Nekoosa mill. The new plant is designed to filter 3,600 gallons of water per minute and plans of equipment are so arranged that additional beds can be installed if and when increased capacity is necessary. The use of pure spring water from the company's man-made Nepco Lake will continue. Operation of the new filter plant began early in October.

The 52 by 75 foot filter plant building houses a coagulation basin and six filter beds using anthrafilt as a filtering medium. Anthrafilt is a finely ground anthracite coal thoroughly washed and carefully screened to the proper uniform size. Impurities in the water are taken out by the anthrafilt as the water passes through it and the filtered water, in the case of the Nekoosa plant, is expected to have a color of five parts per million or less.

When the water is pumped from the Nepco Lake settling basin to the new filter plant, it enters the coagulation basin. Here it is treated to support the formation of a floccule which assists in the filtering process. The water then passes through the filter beds and on to the bleach plant. The filter beds are supplied with backwashing equipment in order that frequent cleansing of the anthrafilt may be accomplished with as little effort as possible. All pumps and valves in the new plant are automatically controlled from operating panels conveniently located at each filter bed.

◆

PULPWOOD SAWS FEATURE OF FORESTRY FIELD DAY

Pulpwood saw demonstrations were among the features of the Forestry Field Day held October 10 at Macon, Georgia. Other demonstrations included methods of sawing timber, cutting trees, tree planting, use of fire break plows, use of machine to plant young timber, power log loading equipment and the use of the airplane in spotting forest fires.

New gravity-type filter plant now in operation at Port Edwards (Wis.) plant of Nekoosa-Edwards Paper Company

Among the five hundred spectators were school officials of several counties in middle Georgia who were asked to carry the fire prevention program back to their respective counties. Speakers included Dr. G. L. Carver, of Mercer University, chairman of the Bibb County Forestry Association; Tom Linder, commissioner of agriculture; and A. R. Shirley, director of the Georgia department of Forestry.

The special importance of fire prevention and fire control was stressed by Hugh Allen, district forester, Georgia Department of Forestry, and Larry Newcomb, cooperative marketing agent, U. S. Forest Service. Other representatives of the International Paper Company were: Walter Hottle, James J. Tucker, V. J. Kumitz, H. M. Woller, W. F. Mattlage, and George Cochrane.

◆

INTERNATIONAL PAPER & SOUTHERN ASS'N DISCUSS CONSERVATION OF TIMBER

Proper forestry management and timber conservation practices in relation to pulpwood production were among the topics discussed at a timber conservation meeting held October 7 at Albany, Georgia, by the International Paper Company in conjunction with the Southern Pulpwood Conservation Association.

Henry Malsberger, general manager of the Southern Pulpwood Conservation Association, said that approximately fifty pulp mills operating in the South have been established since the early 1930's, with several more mills under construction at this time. The development of the pulp industry has furnished a ready market for low grade timber which in the past was not marketable.

R. S. Andrews, conservation engineer for the International Paper Company, emphasized the effect of proper forest conservation and utilization on the future economic welfare of the South. "Only through proper cutting, intensive management, replanting and fire control can a long-range timber supply be established."

◆

WOOD BARK IS CONVERTED INTO WRAPPING PAPER AT CHICAGO TRIBUNE MILLS

Wood bark, previously discarded as waste material in the manufacture of newsprint, has been made into wrapping paper at the *Chicago Tribune* mills in Thorold, Ontario. Two rolls of paper incased in the bark wrapping recently arrived at the *Tribune* reel room, Chicago.

The bark wrapping paper, examined by technicians, was described as satisfactory. Fred J. Byington, Jr., assistant business manager for the *Tribune*, said that the manufacture of wrapping paper is still in the experimental stage and that improvements in its manufacture are expected.

The paper is of brownish-chocolate color and its durability is said to compare favorably with that of heavy wrapping paper made of pulpwood. Mr. Byington estimated that the annual saving throughout the industry would be 16,000 tons of sulphite and 24,000 tons of groundwood, if the discarded bark is converted by other mills to wrappers.

The *Tribune* mills began experimenting with a process for using bark some time ago and have produced pie

De Laval boiler feed pump, 800 g.p.m. capacity against 850 psi pressure, in a large Detroit automobile plant.

"IN EXCELLENT CONDITION after 56,000 hours"

reports inspector

DE LAVAL BOILER FEED PUMPS STAND UP IN HIGH PRESSURE, HIGH TEMPERATURE SERVICE.

After 56,000 hours of service over a period of nine years, the power plant superintendent of a large Detroit automobile manufacturer asked for an inspection of this pump. The inspection was made and the following report received.

"We completely disassembled the pump and found wheels, diaphragms, shaft, bearings and all other parts in excellent condition. There was no washing of the pump case or any kind of corrosion. The shaft sleeve was highly polished. Balance parts including labyrinth leak off and the leak off bushing over the discharge end of the shaft sleeve hubs had but .005" wear."

In every detail De Laval pumps are designed for long trouble-free service.

DE LAVAL STEAM TURBINE CO.
TRENTON 2, NEW JERSEY

Atlanta • Philadelphia • Charlotte • Pittsburgh
Cleveland • Rochester • Detroit • San Francisco
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BF-4

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

plates from the material. Cardboard containers and other products can be made from bark, it was said.

It was also disclosed that the *Tribune* plants in Canada will use 18,000 cords of poplar in the manufacture of newsprint this year. The practice in the past has been to use spruce and balsam exclusively in the manufacture of paper pulp. The use of poplar requires a special process.

◆

VAST TIMBERLANDS IN VANCOUVER ACQUIRED BY 3 U. S. PAPER COMPANIES

A large stand of timber on Vancouver Island has been sold to Soundview Pulp Company, Everett, Washington; Crown Zellerbach Corporation, San Francisco; and Jamison Mill Company, Everett. The deal transfers ownership of Elk River Timber Company, British American Timber Company, Uncona Timber Company, and Rothmere Timber Company to the three United States firms.

Though export of logs is at present under rigid federal control, it is believed the new owners intend to take logs from the area to supply their pulp mills in Washington. According to records of the Elk River Timber Company, ninety million feet of timber cut in the area in 1943 was exported to the United States in log form.

The new owners plan to undertake an extensive reforestation program which will establish timber yield for one hundred years. They already have rehabilitated nineteen miles of a 38-mile logging railway.

◆

SCOTT PAPER CO. PAYS OFF EMPLOYEES OF MILL IN NOVA SCOTIA DESTROYED BY FIRE

A plan of final payments to the forty people who have been employed at its pulp mill in Charleston, Nova Scotia, has been announced by Scott Paper Company, Erie, Pennsylvania. This mill was completely destroyed by fire on September 28 and the company does not plan to rebuild it at this time. The mill was acquired by Scott in 1927. It has been an excellent producer of high quality groundwood pulp.

Employees needed to perform salvage and other necessary work will be continued on the pay roll at Charleston for as long as required. Thereafter, each employee will receive his regular pay for two weeks and for a further period of one week for each year of service. Several of the employees with long service records will receive a monthly pension.

BRIEFS

▶▶▶ THE NEW PLANT of Continental Can Company, Inc., in Utica, New York, will go into production after January 1, according to a recent announcement by the plant manager, E. J. Engel. He said although construction is behind schedule, the plant is receiving its first shipments of paper stock.

◆

▶▶▶ INSULATING AND building board will be manufactured in a plant now under construction at Miami, Florida, by Ware Laboratories, Inc. It is understood this plant will turn out 40 tons per day. The company will make use of this material in the manufacture of prefabricated houses. Norman E. Howett is vice president and general manager of the company; George R. Gibson is treasurer.

◆

▶▶▶ EXPANSION OF activities of Fraser Companies, Ltd., Edmundston, New Brunswick, is reflected in revised capacity figures. The company's new pump mill now under construction at Newcastle (N. B.) has been designed to manufacture approximately 120 tons daily of unbleached sulphate pulp. It is now expected this new plant will go into production during 1949. Estimated capacities for Edmundston are: unbleached sulphite pulp, 105,000 tons annually, of which 80 per cent is bleached; groundwood pulp, 35,000 tons annually; and paperboard, 20,000 tons per year.

◆

▶▶▶ NEW ZEALAND'S government plans to establish a state paper and pulp manufacturing works at a cost of $22,680,000. Another big timber project has been announced by New Zealand Forest Products which will require an expenditure of $11,340,000. The company stated it would construct a mill to produce 42,000,000 feet of timber a year and the waste from the timber mill would feed pulp and paper mills which would be set up beside it.

◆

▶▶▶ PLANS ARE BEING made for another Pulpwood Forestry Contest in New Hampshire. The purpose of the contest is to encourage selective cutting. Prizes will be offered as in the contest last year. The planning committee includes K. E. Barraclough, extension forester at the University of New Hampshire; State Forester John Foster; D. J. O'Brien, Coos County agent; and Robert Phipps, Coos County forester. The contest is being supported by Groveton Paper Company, Inc., St. Regis Paper Company, International Paper Company, Marcalus Manufacturing Company, The Brown Company, and West Virginia Pulp and Paper Company.

◆

▶▶▶ ACQUISITION OF control of the Elk River Timber Company, Ltd., Vancouver, British Columbia, was reported to the Securities Exchange Commission recently by the Soundview Pulp Company, (Everett, Wash.). The company stated it purchased 4,131 of the 7,500 outstanding shares at a total cost of $1,008,511.

◆

▶▶▶ A COMPANION COMPANY of the Masonite Corporation, of Chicago, Masonite Africa, Ltd., is building a plant for completion next year at Estcourt, Natal, Union of South Africa. The company will make wood fiber hard boards and insulation boards as does Masonite Corporation (Australia), Ltd., at Newcastle, New South Wales, and Masonite Company of Canada, Ltd., Gatineau, Quebec.

◆

▶▶▶ THE RECRUITING of some 3,000 displaced persons from Germany and Austria to work in the Ontario woods on the cutting of pulpwood has been arranged. Applications have been approved for another 1,500 men who are expected to be placed at work before the end of the year. This is one of the steps being taken to restore depleted supplies of pulpwood at newsprint mills, Vernon Johnson, manager of woodlands for the Canadian International Paper Company, said in a recent meeting of the United States House Committee with members of the Canadian newsprint industry.

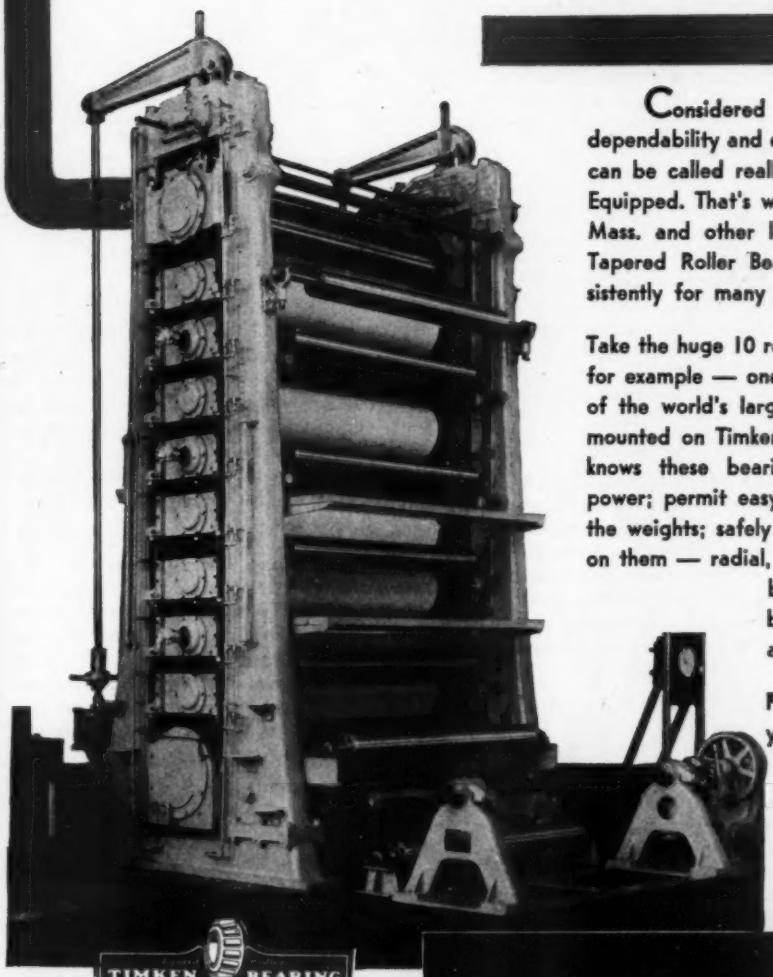
◆

▶▶▶ A SERIAL LOAN of $2,000,000 maturing October 1, 1948 to October 1, 1952 has been arranged by Eastern Corporation (South Brewer, Maine) through Central National Corporation of New York. The notes will carry a 2½ per cent interest rate. The proceeds together with treasury funds are being used to retire the company's outstanding first mortgage 3¾ per cent bonds.

◆

▶▶▶ FOR THE BEST ANNUAL financial report of the paper products industry, the bronze "Oscar of Industry" has been awarded by *Financial World* to Union Bag & Paper Corpo-

MODERN SUPERCALENDERS TAKE FULL ADVANTAGE OF TIMKEN BEARINGS



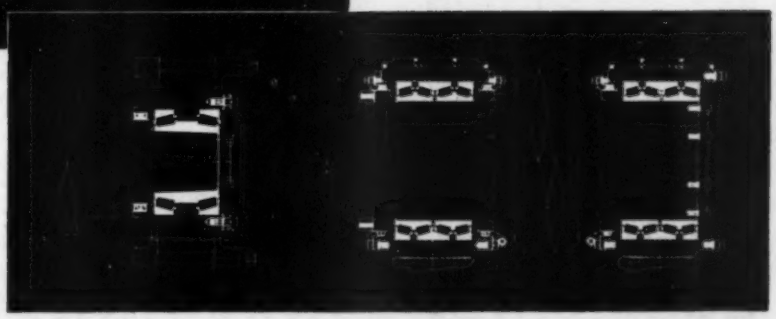
Considered on the basis of production, quality, dependability and economy, no calender or supercalender can be called really modern unless it is Timken Bearing Equipped. That's why B. F. Perkins & Son, Inc., Holyoke, Mass. and other leading calender builders use Timken Tapered Roller Bearings — and have used them consistently for many years.

Take the huge 10 roll Perkins supercalender pictured here for example — one of 4 built for the paper mill of one of the world's largest magazine publishers; all rolls are mounted on Timken Roller Bearings because the builder knows these bearings assure smooth operation; save power; permit easy starting at any time without raising the weights; safely carry all loads that may be imposed on them — radial, thrust, or both together in any combination; do not leak lubricant, thereby preventing paper contamination and making the full width usable.

For modern performance make sure you have Timken Bearings in the equipment you buy. Look for the trademark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN BEARING EQUIPPED

TIMKEN TAPERED ROLLER BEARINGS



Timken Bearing application as used on intermediate rolls of supercalenders.

Timken Bearing application as used on top and bottom rolls of supercalenders.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◐ AND THRUST →◐← LOADS OR ANY COMBINATION ✳

ration, New York City. In this industrial classification, Dennison Mfg. Company (Framingham, Mass.) was runner-up and United Wallpaper, Inc., Chicago, came in third. The judges included Dr. Lewis Haney, professor of economics of New York University; Glenn Griswold, editor and publisher of Public Relations News; Sylvia F. Porter, financial editor of the New York Post; Elmer Walzer, financial editor of the United Press; and Lester Tichy, art critic and industrial designer.

◆

▶▶▶ A NEW ORLEANS branch sales office has been opened by International Paper Products Division of International Paper Company, New York. H. Currie is the district sales manager and the office is located at 502 Hibernia Bank Building, New Orleans.

◆

▶▶▶ THIRTY VETERAN employees of West Virginia Pulp and Paper Company, New York, were retired recently under the company's retirement program. Among those retiring were Thomas H. Stirling, resident manager of the company's Mechanicville (N. Y.) plant for the past forty years and a member of the board of directors since 1930; Charles Cass, secretary of the company since 1909 and a member of the board of directors since 1927; and Henry L. Condit assistant secretary since 1915.

◆

▶▶▶ AN EMERGENCY SUPPLY of newsprint is being provided by Claremont Paper Company, Inc. (Claremont, N. H.) to prevent curtailment or actual suspension of the local daily newspaper, the *Claremont Eagle*. The paper company specializes in kraft products, and the paper it has provided is of a different color or tint than ordinary newsprint. The 50-ton order is sufficient to supply the needs of the local newspaper for the remainder of the year.

◆

▶▶▶ ABOUT 100 MEMBERS attended the fifteenth annual banquet of Gair Old Timers Association held October 18 at the Hotel New Yorker, New York. New officers were elected. This association was founded in 1933 in memory of Robert Gair, founder of Robert Gair Company, Inc., by those who worked or had worked for Mr. Gair or his company.

◆

▶▶▶ INITIAL CONTRACT for the construction of a new digester unit at the Canada Paper Company, Windsor Mills, Quebec, has been given to R. E. Stewart Construction Company, Sherbrooke, Quebec. The interior work in the new $144,000 bag factory at this plant is progressing rapidly.

◆

▶▶▶ THE TOTAL PRODUCTION of wood pulp in the U. S. in 1946 aggregated 19,277,667 tons. North and South Carolina combined led the Southeastern states, where 50 per cent of the South's production came from. This report was released by C. W. Martin of Charleston, South Carolina, district manager of the United States Department of Commerce.

◆

▶▶▶ THE THIRD ANNUAL management conference of the Crown Zellerbach Corporation was held at Gearhart, Oregon, September 29. The executives attending discussed company policies and toured the corporation's holdings in Clatsop County, Oregon, where its largest sustained yield timber holding is located. E. C. Stamm of Portland, logging manager of the firm, conducted the tour.

◆

▶▶▶ A 180-INCH MACHINE with a capacity of 240 tons per day will be built for the new St. Regis Paper Company mill at Tacoma, Washington, by the Pusey and Jones Corporation of Wilmington, Delaware. It will be in operation by the end of 1948, according to officials of the company's kraft pulp division. The paper mill will adjoin the present mill which has a 300-ton capacity. A bag factory also will be built, with installations amounting to $6,000,000.

◆

▶▶▶ A NEW CONCERN, Potsdam Paper Mills, Inc., has purchased the former Unity Paper Mills in Potsdam, New York, which had been owned and operated by the Reading Corrugated Container Company. The mill which was originally built by the late A. L. Lockwood around 1900, was closed down in June of this year. Extensive expansion is planned, and new equipment and machinery will be installed.

◆

▶▶▶ THE NAME OF the Ontonagon Fibre Corporation (Ontonagon, Mich.) has been changed to National Container Corporation of Michigan as of October 1, 1947. Practically all of the stock of the company has been acquired by National Container Corporation of Delaware. There will be no changes in management or personnel.

◆

▶▶▶ A CHANGE OF NAME by the Greeting Card Industry to The National Association of Greeting Card Publishers was decided at its sixth annual meeting held on October 9 at the Waldorf-Astoria Hotel in New York. Its purpose is to stress promotional activities to increase greeting card sales by means of a national public relations and publicity program.

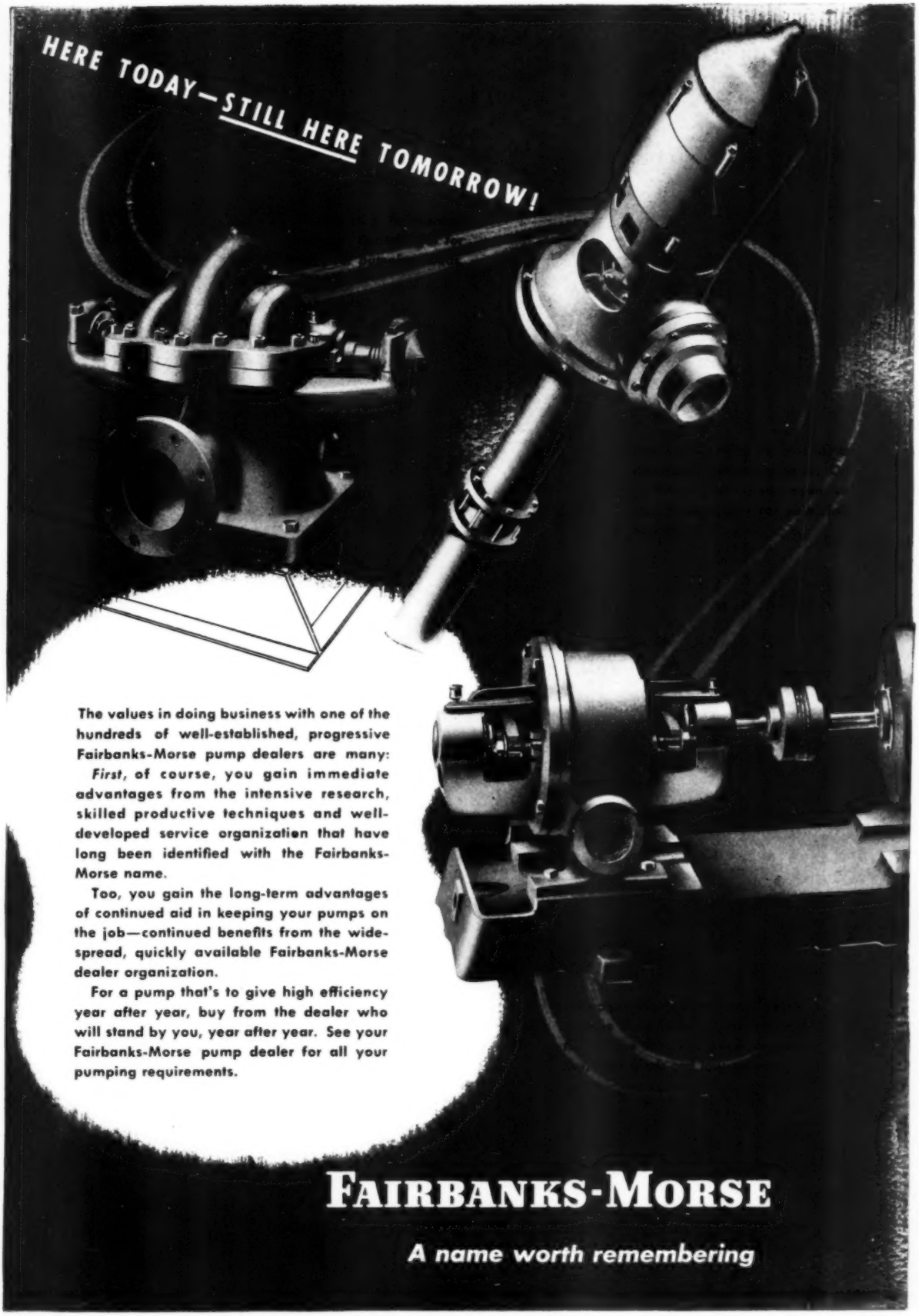
◆

▶▶▶ AN INSPECTION VISIT to the $15,000,000 cellulose pulp mill project at Watson Island, seven miles from Prince Rupert, British Columbia, was made recently by S. B. Roberts, chief engineer of the Celanese Corporation of America, New York. The excavation work, which involves the removal of 250,000 yards of rock, is expected to be finished by December. The plant will be in operation in about eighteen months.

◆

▶▶▶ CONSTRUCTION WORK was started recently on a $170,000 office and warehouse building in Houston, Texas, for the Southwestern Paper Company, a division of the Butler Paper Corporation of Chicago. The building is being erected on a site purchased at a cost of $20,000. The Southwestern company supplies newsprint to a number of weekly newspapers in the Houston and Southwest area.

WE BELIEVE
The best way to cut costs is to *produce more efficiently*, and the two major requirements for this are wise management and conscientious labor.
EASTWOOD-NEALLEY
CORPORATION
AT BELLEVILLE, N.J. SINCE 1877



The values in doing business with one of the hundreds of well-established, progressive Fairbanks-Morse pump dealers are many:

First, of course, you gain immediate advantages from the intensive research, skilled productive techniques and well-developed service organization that have long been identified with the Fairbanks-Morse name.

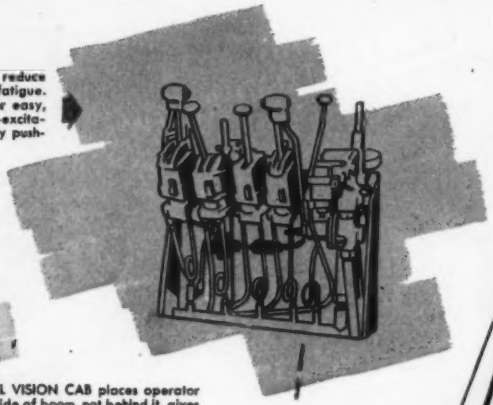
Too, you gain the long-term advantages of continued aid in keeping your pumps on the job—continued benefits from the widespread, quickly available Fairbanks-Morse dealer organization.

For a pump that's to give high efficiency year after year, buy from the dealer who will stand by you, year after year. See your Fairbanks-Morse pump dealer for all your pumping requirements.

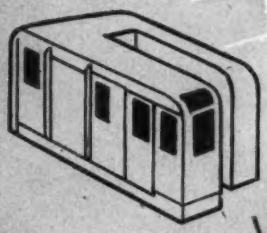
FAIRBANKS-MORSE

A name worth remembering

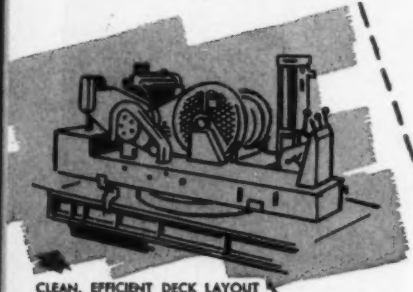
Tested and Proved . . . . . .



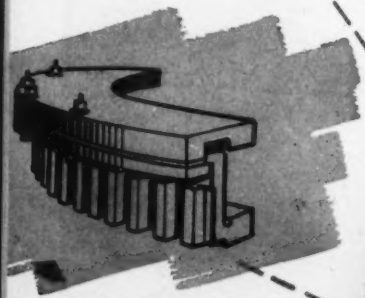
FINGER TIP AIR CONTROLS reduce waste motion and operator-fatigue. Control levers positioned for easy, natural use of hands. Over-excitation of magnet controlled by push-button.



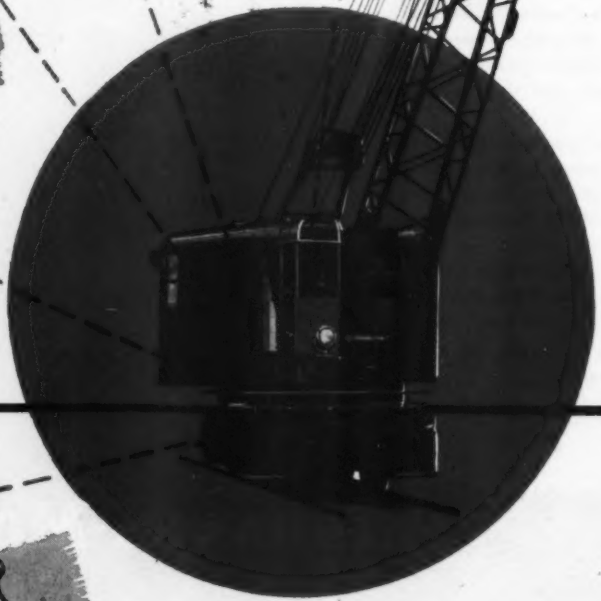
FULL VISION CAB places operator at side of boom, not behind it, gives him full view of load at all times.

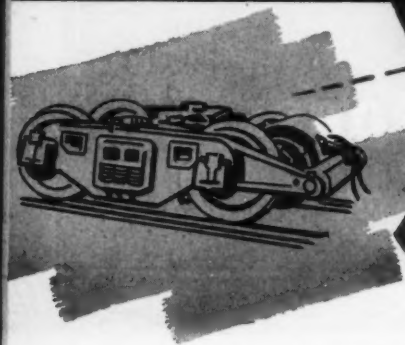


CLEAN, EFFICIENT DECK LAYOUT makes maintenance easy. No pyramiding of deck equipment. All machinery enclosed. Welded, rolled steel full width deck.



ENCLOSED ROLLER BEARING TURNTABLE uses American's exclusive, patented interlocking gib ring. Nine foot diameter turntable has 27 bronze bushed conical steel rollers —live, stable load-carriers.





ELECTRIFIED CARBODY has two powerful electric motors driving truck axles through single reduction spur gears and pinions sealed and running in oil.

Diesel Power to the Deck

Electric Power to the Trucks

. . . on the World's Toughest Jobs

THE AMERICAN

DIESELECTRIC

A REVOLUTIONARY NEW LOCOMOTIVE CRANE

Scores of major wearing parts eliminated in the underbody . . . a clean, efficient deck, where maintenance work is a matter of minutes . . . smooth, powerful electric motors driving the wheels!

• • • That's the mechanical story of the AMERICAN DIESELECTRIC. But the economic story—established by years of testing on industry's toughest jobs—is even more important: *this crane will earn back its own cost in five years.*

In mechanical cranes, 50% to 75% of all maintenance work has been in the travel mechanism. By designing this clean, simple electrified drive, American Hoist engineers have actually reduced upkeep expense by as much as 25% to 50%!

The AMERICAN DIESELECTRIC is not a converted crane. It is new in every part, from trucks to boom point . . . specifically created for the best utilization of diesel-electric power. Obviously, this was not an "overnight" job of engineering.

Actually, the development of this crane has required about fifteen years. On-the-job tests have now run two to seven years in railroad and industrial operations. Names of users and detailed cost studies will be furnished upon request.

A new catalog, just off the press, gives full specifications and operating data. Mail the coupon below.

ASK THE MAN IN THE CAB!

Even the world's finest locomotive crane can be no more efficient than its operator. For that reason, American Hoist engineers have given the DIESELECTRIC the most comfortable, orderly and ingenious cab arrangement ever created. The cab is forward of the main deck mechanism, to right of boom. Operator sits high and close to the boom at the best possible angle for guiding his load. Windows front, side and top permit excellent view even in cold weather operation. The cab is fully partitioned from machinery deck . . . clean, quiet and comfortable at all times. Controls are all air-actuated, and levers respond to finger-tip pressure, assuring maximum work output and minimum fatigue.

DIESEL-ELECTRIC LOCOMOTIVE CRANE, PATENT NO. 2263481. TOUCH CONTROL, PATENT NO. 2270856.

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Please send me your new catalog describing AMERICAN Dieselectric Locomotive Cranes.

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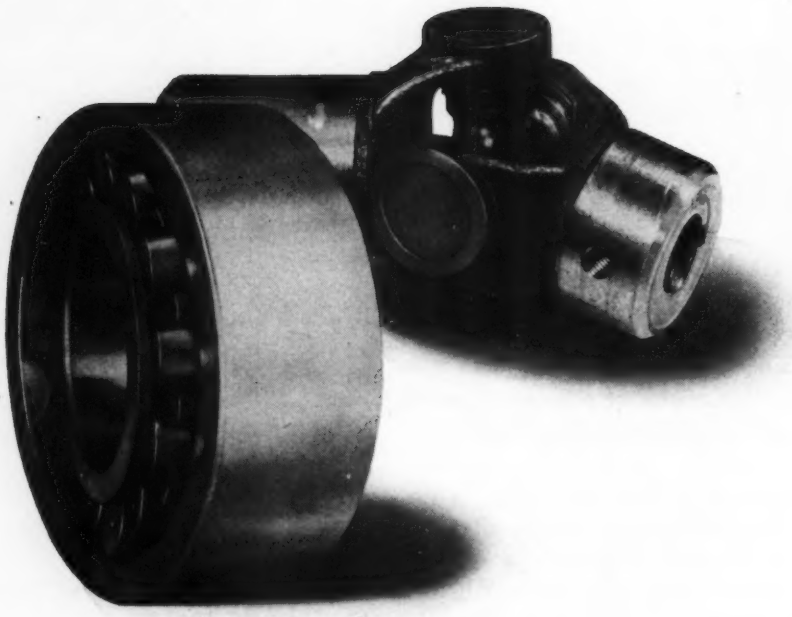

Misalignment accommodated smoothly...

as a universal joint allows out-of-line shafts to rotate freely, similarly the Spherical Roller Bearing accommodates misalignment and shaft deflection. Rapid wear, binding and unusual stresses can be eliminated

By this "universal" self-aligning bearing...

which operates at full radial and thrust capacity under conditions of misalignment which cause premature failure of other types of bearings.

This feature of the Torrington Spherical Roller Bearing is coupled with the advantages of high radial capacity, two-directional thrust capacity and unit design for easy handling. Write for further information contained in our Technical Bulletin #200-A.

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SOUTH BEND 21, INDIANA TORRINGTON, CONN.

Offices in All Principal Cities

TORRINGTON BEARINGS

• NEEDLE • SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • BALL •

Now in Operation —

The World's Largest PULPSTONE

a Norton Stone for Grinding 5 Foot Wood

THE starting up of the new groundwood mill of the Houston Division of the Champion Paper & Fiber Company at Pasadena, Texas marked an important step in the production of mechanical pulp. Its 3000 H.P. grinders with Norton Pulpstones 62" x 66" are the first to grind five foot wood.

When the first Norton pulpstone went into service twenty-one years ago it was 27" wide for grinding two foot wood and was driven by a 200 H.P. motor.

But it opened a new era—the efficiency of the manufactured pulpstone made possible larger and more productive grinders. Wood lengths went to 30", to 48" and now to 60".

Norton engineering service is ready to supply you with just the pulpstone that you need—"tailor-made" to produce your type of pulp from your type of wood with your type of equipment.

NORTON COMPANY, Worcester 6, Mass.

NORTON COMPANY
OF CANADA, LTD.
Hamilton, Ontario

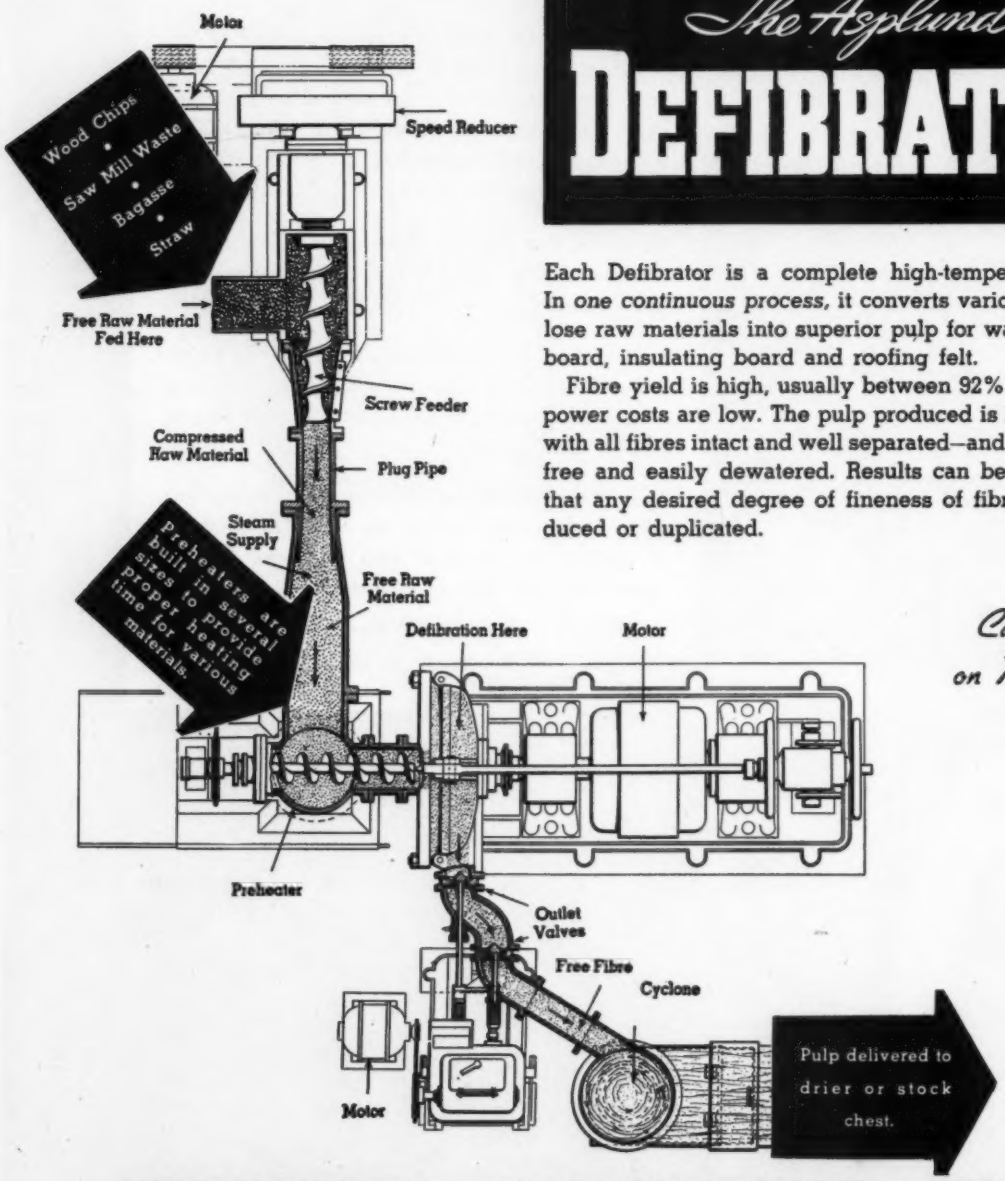
T.M. REG. U.S. PAT. OFF.

NORTON ABRASIVES

ABRASIVES · GRINDING WHEELS · GRINDING AND LAPPING MACHINES · REFRACTORIES · POROUS MEDIUMS · NON-SLIP FLOORS · NORBIDE PRODUCTS · LABELING MACHINES

for economical production of more uniform pulp.....

The Asplund DEFIBRATOR



Each Defibrator is a complete high-temperature refiner. In one *continuous process*, it converts various ligno-cellulose raw materials into superior pulp for wall board, hard board, insulating board and roofing felt.

Fibre yield is high, usually between 92% and 96%, and power costs are low. The pulp produced is homogeneous, with all fibres intact and well separated—and it is extremely free and easily dewatered. Results can be controlled so that any desired degree of fineness of fibre can be produced or duplicated.

Catalog on Request

AMERICAN DEFIBRATOR, INC.

CHRYSLER BUILDING • NEW YORK 17, N. Y.

Represented on the West Coast by

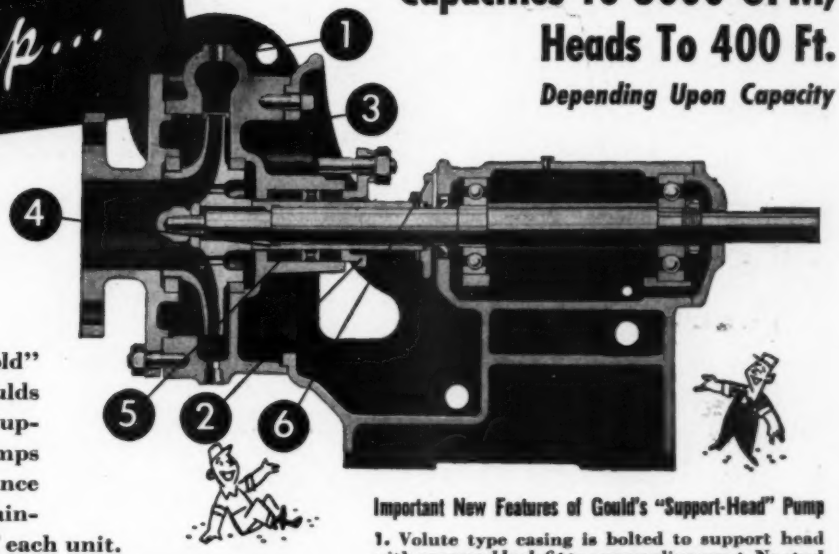
A. H. Lundberg, Textile Tower, Seattle, Wash.

THE "SUPPORT-HEAD"

26 Sizes, Capacities To 3000 GPM, Heads To 400 Ft.

Depending Upon Capacity

Another new Goulds Pump...



LIKE the new "Close-Cupld" announced recently, Goulds new series of ball-bearing "Support-Head" Centrifugal Pumps embody features which enhance pumping efficiency, simplify maintenance and prolong the life of each unit.

Extra-heavy, well-proportioned construction throughout (see cross section) assures trouble-free operation 24 hours per day under the most severe service conditions. And like the "Close-Cupld," wearing parts also have been standardized for the "Support-Head" to fit pumps of different sizes. This reduces spares to a minimum, important where pumps of different sizes are used in the same plant.

New and improved design features are fully covered in a new bulletin, available on request. Use coupon below or write your nearest Goulds office.

Important New Features of Gould's "Support-Head" Pump

1. Volute type casing is bolted to support head with *recessed lock fit* to assure alignment. No stud or bolt holes tapped through casing to liquid ways.

2. A new split gland makes it unnecessary to unbolt gland halves when repacking stuffing box—saves time.

3. Full, open-top construction permits ready access to gland and stuffing box, important where pump is located in an inaccessible position.

4. Shaft sleeve covers full length of shaft, completely protects shaft from liquid damage. Shaft sleeve is free to expand or contract with temperature changes to prevent buckling and distortion.

5. Stuffing box is regularly provided with die-formed, semi-metallic packing. A mechanical seal may be substituted where preferred (without necessity of any remachining of stuffing box).

6. Liquid deflector prevents leakage of liquid into motor bearing and is drilled and tapped so that in servicing pump it can be used to prevent shaft rotation while removing or tightening impeller nut; also to remove sleeve . . . a time saver.

GET THE FACTS ABOUT GOULDS NEW "SUPPORT HEAD"!

Your copy of Bulletin 715.1 is ready. It contains full specifications, materials of construction with A.S.T.M. designations, complete characteristic curves with efficiencies and horsepower ratings of *each* pump and all dimensional data to make a layout.

GOULDS PUMPS, INC.
DEPT. PI-11, SENECA FALLS, N. Y.

Please send me a copy of your new "Support-Head" Bulletin 715.1.

NAME_____

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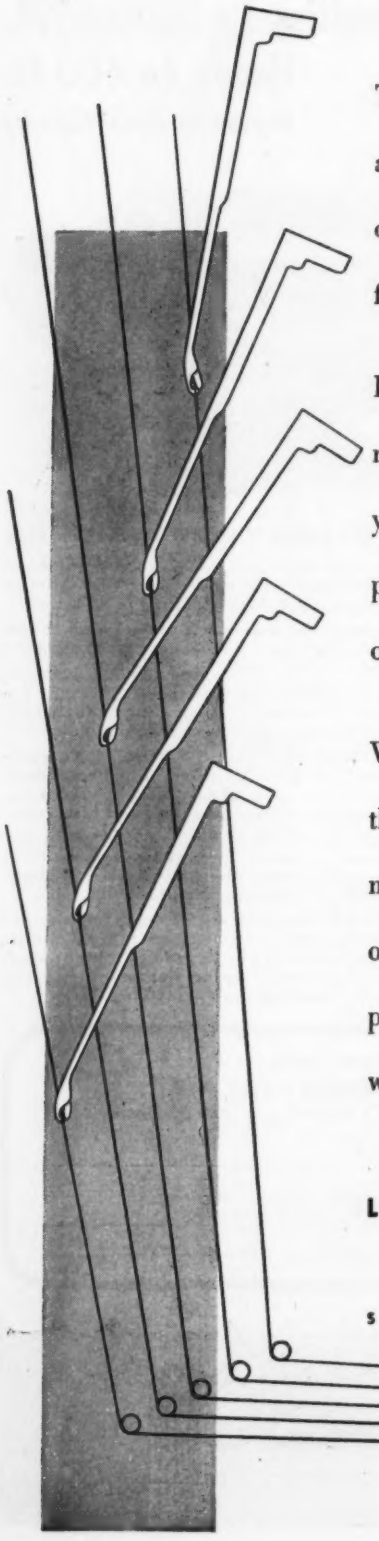
GOULDS

PUMPS, INC.

the PUMP FOR the JOB

WE INVITE YOU TO PUT TENAX FELTS TO THE TEST

. . . . . OUR SERVICE TO THE PROOF



The enlargements and betterments in progress at our plant are designed to increase our facilities to serve you and to continuously improve each **TENAX FELT** that we make for you.

It is our expression of confidence in the future of the paper-making industry and our desire to serve it . . . and to serve you . . . with felts of longer and longer life that cut your production costs and keep your machines running full out and trouble free.

We have been a partner-in-service to the paper-makers of the country for 56 years and in that time have established many pleasant relationships that have been of profit both to our customers and ourselves. If you are one who has yet to put **TENAX FELTS** to the test or our service to the proof, we invite you to afford us that opportunity.

LOCKPORT FELT COMPANY
NEWFANE, N. Y.

TENAX
"TENAX FELTS ARE TOUGH"

SERVING THE PAPER INDUSTRY SINCE 1891

VESSEL DIVISION

NEWS

A. O. SMITH

Corporation

MILLION ELECTRODE MAN. (*above*) In his twenty-one years of painstaking welding on SMITHway pressure vessels, John Binder has used up 975,744 SMITHway electrodes—at last count!

STRESS-ANNEALING BY THE INCH! (*above*) When a vessel is too long, or its diameter too great, to fit into one of the monster A.O. Smith furnaces, the engineers devise a portable furnace and stress-anneal section by section and the final closing seam.

REFINERY ON WHEELS! (*below*) Not long ago this train pulled out of the A. O. Smith yards bearing almost the entire vessel equipment for a completely new refinery unit. The single shipment included coking drums, fractionating towers, stripping columns, flash chambers and coke chambers.

VANDERBILT

PRODUCTS FOR THE PAPER INDUSTRY

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

Salute the Paper Industry!

▶▶▶ STAND UP STRAIGHT. Click your heels together; turn your toes out like a well-bred duck; take off your hat and bow low to the paper industry.

Break forth into joy. Sing together, ye integrated mills of America, for your redemption has come. You have emerged, after wandering for forty long years in the wilderness of the nonprofit industries of this continent, and are now numbered among those sustaining industries which contribute to the wealth of our nation.

Witness the current and nine months accumulated net earnings being reported weekly by the leading corporations of the sixth ranking industry of this country—the paper industry.

Witness also the reports that some of the meticulously cautious investment trusts recently have taken into their portfolios the securities of some of our industry's leading corporations.

What a contrast to the former attitude of these national guides to investors, whose constant advice for years prior to the war, was "don't invest in paper mill securities—they are of a nonprofit industry." And, what a compliment to the long, hard battle for industrial financial integrity which our industry has waged. For the admission of these paper mill securities to investment participation alongside such bellwethers as the iron and steel, automobile, utilities, electrical communication, and other seasoned demonstrators of profit-making ability, is a signal victory.

The significance lies in the fact that after thorough research of the paper mill securities—especially those of our integrated mills—the soundness of their values and the ability to make continuous good earnings has the stamp of their preferred approval.

After all, this is not to be wondered at. For more than two generations, the paper industry has built mills, and built mills, decade after decade, putting its earnings back into the progress of the industry's expanding opportunities and developing techniques, until at the outbreak of World War II it had provided a peak of production of essential products never before envisioned. It was the peacetime peak of overproduction. But a most fortunate peak for us and our allies. It enabled us to win the war; for all wars are won by the nations possessed of the greatest supply of wood and forest products.

No appreciable increased woodpulp capacity has been built in this country since 1941; yet the war almost doubled the demand for pulp and paper products.

This country and Canada produce and consume 77 per cent of the world's production of wood pulp.

The integrated pulp and paper mills of America owning their wood are continuing to run to capacity as they did during the war, with little hope of being able to overtake a constantly expanding demand.

A recent survey of the situation commenting on the world shortage of pulp states:

"One of civilization's basic fibers will be scarce and high until Europe recovers."

When will Europe recover?

"Three years, five, ten, or more—it could be even longer before European pulp production caught up with the world's demand."

In the meantime, the integrated mills of America are looking at continuous profitable operations.

Our advice to investors is buy integrated paper-mill securities. So, we say to our brethren of the industry again—rejoice and be glad, for the day of your redemption from non-profit operations is at hand.

Our Pulpwood Supply Problem

▶▶▶ THE PRESENT PULPWOOD situation was simply and clearly highlighted recently by Oliver D. Diller, associate forester, Ohio Agricultural Experiment Station in a paper which he presented at the Fifth Mid-American Chemurgic Conference, Cincinnati, Ohio (October 1-3, 1947). Although Mr. Diller's paper was on the more general subject of Managing Hardwood Forests for Continuous Production, it delved into the pulpwood problem rather thoroughly.

Here are some of his statements pertinent to pulpwood:

"The fact that 460 million acres or one-fourth of the area of the United States is commercial forest land does not mean that there is now or always will be an abundance of timber. Over 90 per cent of our commercial forests are now in second growth stands in various degrees of stocking. The most serious deficiency in these forests is the lack of growing stock.

"The possibility of profitable sustained yield from our forests depends upon the growing stock in them and this growing stock can be maintained and improved only by wisely planned cuttings. Light and frequent cuts under the selection method of cutting will build up the volume and quality of the merchantable timber. The volume can be increased by currently removing less volume than is added by growth, and the quality can be improved by removing trees of poor form and vigor and reserving the better trees until they are ready to be harvested.

"There are grounds for the belief that if the demand for forest products continues to expand, pulp makers will be forced to devise ways and means of increasing pulpwood production in order to meet competition of other products.

"There are several factors which will influence the amount of wood that will be utilized for pulpwood. Among these are the following: the amount of forest land owned by the companies themselves; a broad program for improving forest management not only on industry-owned lands, but also farm woodlands; the giving of free tree seedlings to farmers by pulp mills; increased mechanization; the use of more species, especially hardwoods; and the utilization of sawmill waste such as slabs and edgings.

"As industry broadens its use of species, it should be able to make wide use of forest and mill waste. It is of interest to note that Sweden in 1937 made 25 per cent of its pulp from sawmill waste. Over 90 per cent of the Swedish lumber industry's solid waste, excluding bark and sawdust, ended up in pulp mills."

Opinion—Biased Because Badly Based

WILLIAM SIBLEY

▸▸▸ ASK THE NEXT 100 people you meet, regardless of their station in life, to define, explain, and describe democracy, communism, socialism, and Fascism. You will get almost as many opinions as you have people and nearly as many contradictions.

Ask another group of people what are the basic, fundamental differences between the Republican and Democratic parties and your chief answer will be a long series of embarrassed blushes.

This being true, how can anyone be so certain that he or she is a Democrat or a Republican or whether communism is not after all the best form of government for certain peoples.

An extremely interesting confirmation of this human tendency to sound off half-cocked or to cling to biased in spite of unbiased facts was recently made by the Opinion Research Corporation and published in a recent issue of *Look* Magazine. This confirmation took the form of public opinion concerning the Taft-Hartley Law. There had been so much controversy, pro and con, relative to the merits of this new labor law that they wanted to know what was the opinion of the individual workers.

To find out they asked the simple question: "Do you think Congress should have passed this bill or not?" In towns of over 25,000 population this question was put to workers both manual and skilled as well as the white collar class. Of the thousands of people interrogated there were factory workers, nonmanufacturing workers, union, nonunion, men, women in all age brackets over 21, Roosevelt voters, Dewey voters, and others and employees of every sized plant or organization. Averaging out the total returns we have the interesting facts that 54 per cent of these people answered the question with "no"—31 per cent said "yes" while 15 per cent held no definite opinion.

Following this question another straight-forward, simply worded question was put: "If you were in Congress would you be for or against laws to do the following things:

"1. A LAW . . . to require unions to give 60 days' notice before they can go out on strike.

"2. . . . to give the company the right to sue the union if the union breaks its contract.

"3. . . . to allow employers to talk to the workers on the subject of joining unions, as long as they don't threaten the workers or promise rewards for not joining.

"4. . . . to require unions to make reports on the money they take in and what they spend it for.

"5. . . . to prevent Communists from holding offices in unions.

"6. . . to prohibit unions from spending money or making contributions in connection with political campaigns for federal offices.

"7. . . . to allow the check-off only if the worker agrees in writing. (The 'check-off' is defined as that system whereby the union member's dues are automatically deducted from his salary by the company and turned directly over to the union.)

"8. . . . to forbid a company to have a union shop until a majority of all the workers vote in favor of it. (A 'union shop' is defined as one in which the worker does not have to belong to the union to get a job, but must join the union after he is hired.

"9. . . . to outlaw the closed shop. (The 'closed shop' is defined as a shop in which no one can get a job unless he already belongs to the union before he goes to work there.)

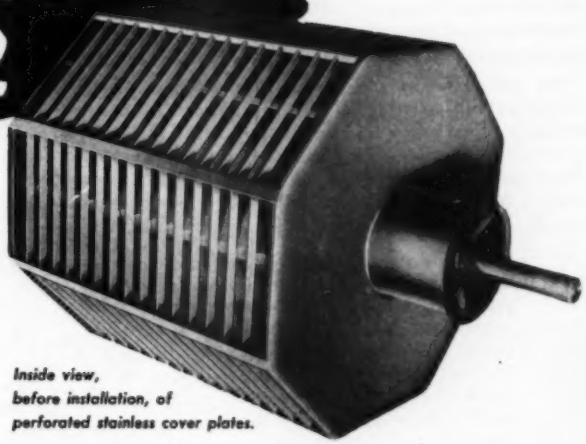
"10. . . . that, in industries considered vital to the country's welfare, allows the government to get a court order preventing a strike for several months while settlements are being attempted."

This question with its ten provisos is in essence what the Taft-Hartley Law provides. It is more than interesting—it is really significant—to learn that when the purposes of the law were broken down and analyzed for these thousands of workers—73 per cent approved of those Taft-Hartley provisions, yet, when asked about the whole bill they give less than half this approval: 31 per cent. Even greater inaccuracies exist among the union members of this interrogated group. To the first simple question having to do with the whole law only 25 per cent approved it. Yet to ten separate planks of the law we know a 68 per cent endorsed it when it was stated to them individually.

I don't know that there is any specific solution to this sort of thing. We doubtless will always have with us the great unwashed and those who are ill-informed. But this instance certainly illustrates the pulling power of propaganda and puts the bite of gross inaccuracy on any survey that is predicated on a simple "yes" or "no." There are many polls conducted throughout the country and on various subjects. When the questions are so phrased as to be answered only by "yes" or "no" very rarely can they be so answered. Even the question: "Did you beat your wife this morning as usual?" Answered "yes" or "no" could not be so answered without self-incrimination.

Perhaps a portion of the solution lies in better relations between management and labor. That means franker, freer, and fuller discussion of labor-mangement problems—"let the chips fall where they may." Certainly if 54 per cent of an unthinking group condemns the position of a certain bill then upon analysis endorses what it does, it is high time we learned how to be better interpreters.

Jones Stainless Steel CYLINDER WASHER RUNNER



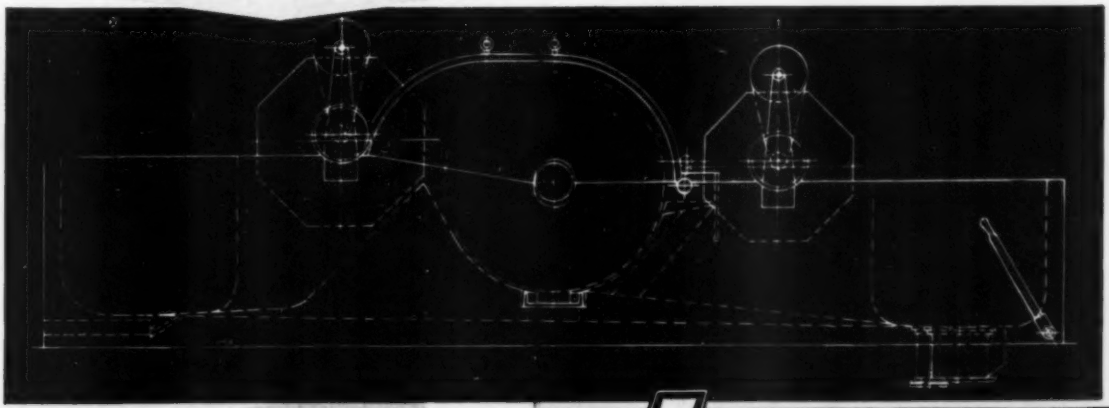
Inside view, before installation, of perforated stainless cover plates.

Here's an entirely new non-corrosive RUNNER for washing pulp, rag, and wood stock. Completely stainless steel, and easy to keep clean, to prevent contamination of stock. Designed to extract sufficient water . . . and provides many modern features to assure efficient, dependable washing.

Built to any size or capacity either as a new unit used with the latest Jones Washer, or as a replacement of your old washer runner.

Standard raising and lowering mechanism normally furnished. Available with hydraulically operated raising and lowering mechanism and also individual gear motor drives, as required.

Tell us your washer problem and we will send you full particulars with quotations.



DIAGRAMMATIC VIEW OF JONES CEMENT TUB WASHER

Jones

E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills

MANUFACTURERS AND DISTRIBUTORS IN CANADA WATEROUS LTD., BRANTFORD, ONT.

Steam . . . water . . . oil . . . or gas
CRANE Supplies all Piping equipment

. . . A good thing to remember for a simplified piping job every time . . . on new or replacement installations. No matter what the fluid or working conditions, see the Crane line first for *all* piping equipment . . . and for dependable quality in every item.

For this water supply system, for example, the Crane Catalog puts everything at your finger tips . . . valves, fittings, pipe, and pipe line accessories. One order to your Crane Branch or Wholesaler covers all your needs. From design to erection to maintenance, your piping job moves fast and smooth . . . with good performance assured . . . because you get this 3-way advantage:

ONE SOURCE OF SUPPLY offering the world's largest selection of steel, iron, brass and alloy piping materials for all power, process, and general service applications.

ONE RESPONSIBILITY for piping materials—helping you to get the best installation, and to avoid needless delays on the job.

OUTSTANDING QUALITY in every item—assuring uniform dependability and durability throughout piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

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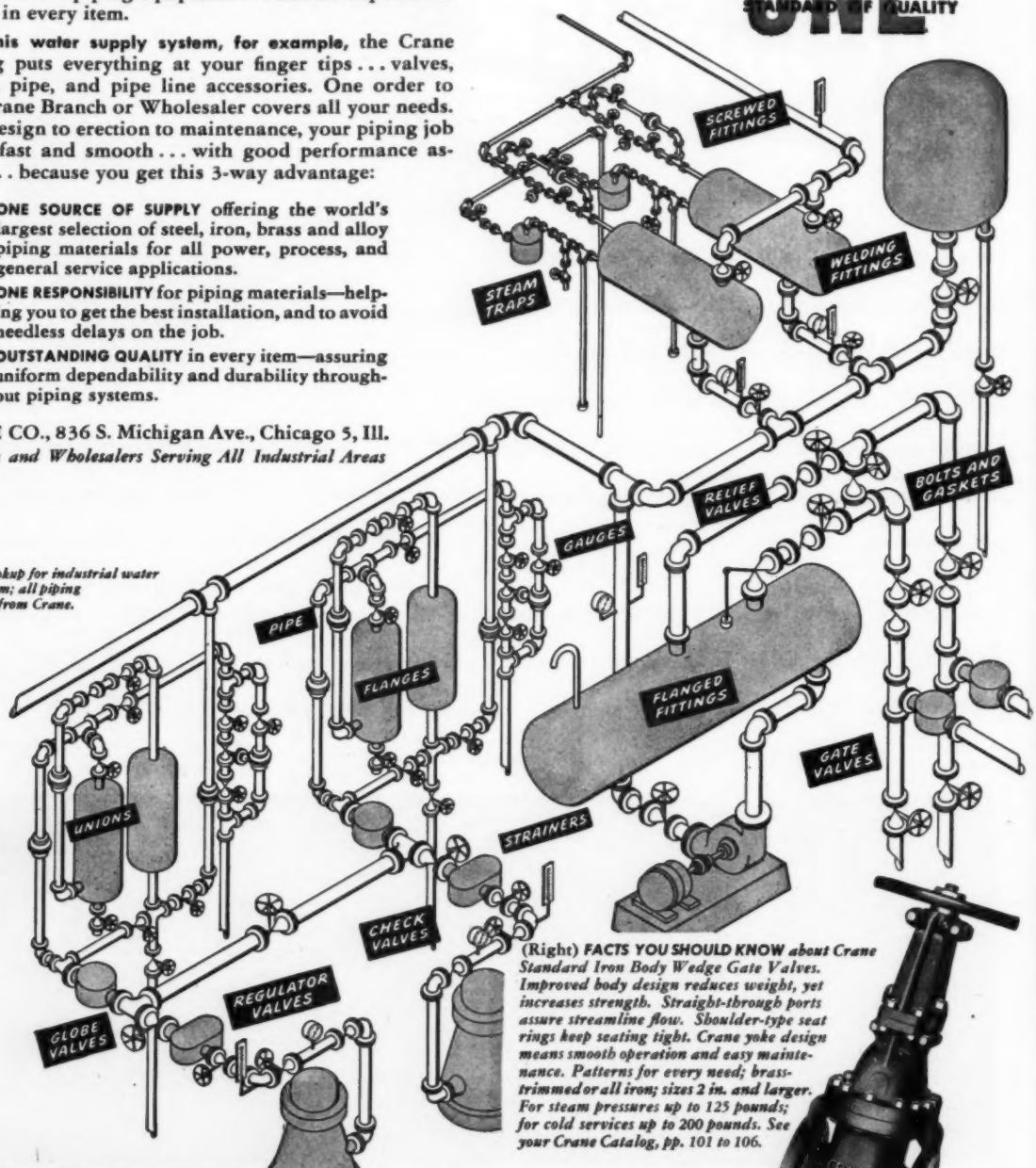


Typical bookup for industrial water supply system; all piping equipment from Crane.

(Right) **FACTS YOU SHOULD KNOW** *about Crane Standard Iron Body Wedge Gate Valves. Improved body design reduces weight, yet increases strength. Straight-through ports assure streamline flow. Shoulder-type seat rings keep seating tight. Crane yoke design means smooth operation and easy maintenance. Patterns for every need; brass-trimmed or all iron; sizes 2 in. and larger. For steam pressures up to 125 pounds; for cold services up to 200 pounds. See your Crane Catalog, pp. 101 to 106.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

Why Engineered

No single type of dryer felt will meet the needs of all mills. But HOOPERWOOD "Canvas Engineering" has the answer to that problem—a specific HOOPERWOOD Dryer Felt for each requirement.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an Asbestos Felt to withstand advanced temperatures in high speed production of Kraft and other heavy papers—there is a HOOPERWOOD felt to fit your need.

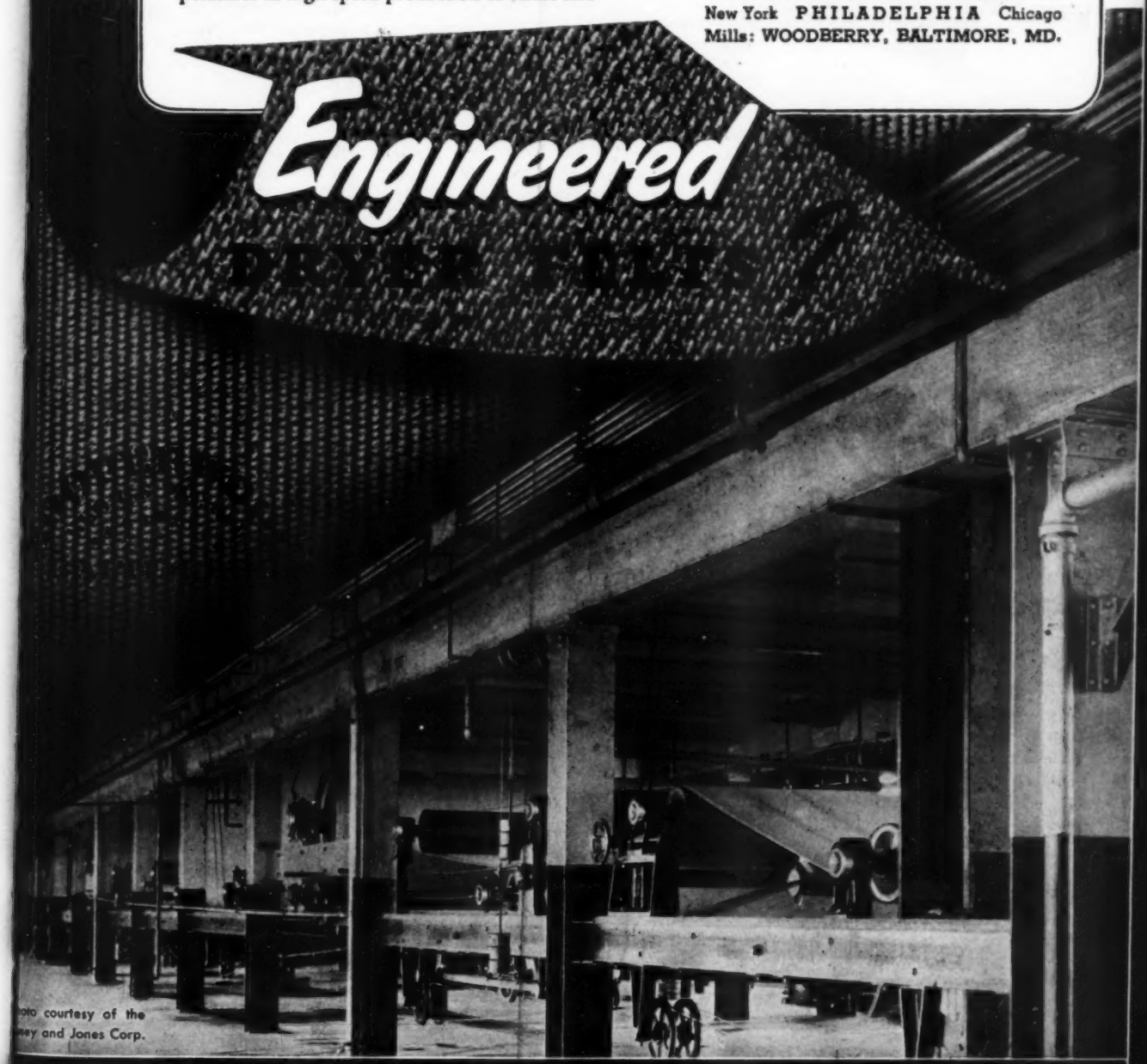
Mill Superintendents find this service invaluable in suiting the particular requirements of their mill—even down to each machine position if desired.

Make your next felt *right*—specify HOOPERWOOD.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.



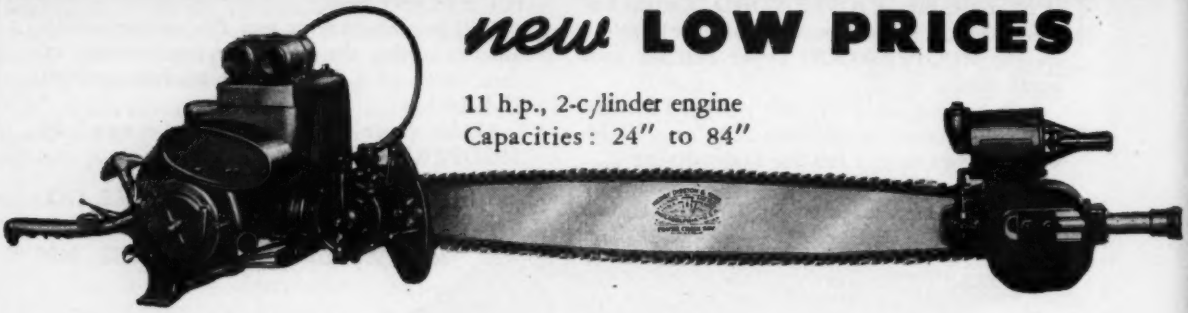
oto courtesy of the
ey and Jones Corp.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS

DISSTON CHAIN SAW

with Mercury Gasoline Engine



new LOW PRICES

11 h.p., 2-cylinder engine
Capacities: 24" to 84"

The Disston Chain Saw is the fastest, timber-cutting, portable saw ever made. It is ruggedly built, light in weight, easy to operate, and cuts from all angles. And its numerous exclusive features combine to make it the most dependable, economical and durable chain saw ever made.

Among these features are an 11 h.p., 2-cylinder engine; a positive-acting, non-slip, multiple-disc clutch; a detachable air cleaner which keeps dust from carburetor; die-cast engine cylinders and cooling fan; gear driven magneto; fuel filter built in tank; a tough, cutting chain of Disston Steel which maintains perfect contact with drive sprocket under all load conditions.

The Disston Chain Saw is a product of Disston saw-making skill and dependability. It's a typical example of the economy of Disston quality. Thousands are now in use on operations of many kinds—in the forests; on railroad contracting, and tree service jobs; at shipyards and manufacturing plants—wherever there are heavy timbers to cut.

DISSTON CHAIN SAW

PNEUMATIC

HUNDREDS OF APPLICATIONS

A powerful, light weight, air-driven saw that is speeding up timber cutting and reducing costs for general contractors, railroads, shipyards, and many other users. It requires no previous experience to operate, and can be used in all climates and weathers . . . even under water.

Gear housing and saw mechanism may be rotated in either direction for vertical or horizontal cutting. Equipped with heavy-duty, vane-type motor specially engineered and produced by Chicago Pneumatic Tool Company for use on Disston Chain Saws. Requires little maintenance as it is built for long, economical service.

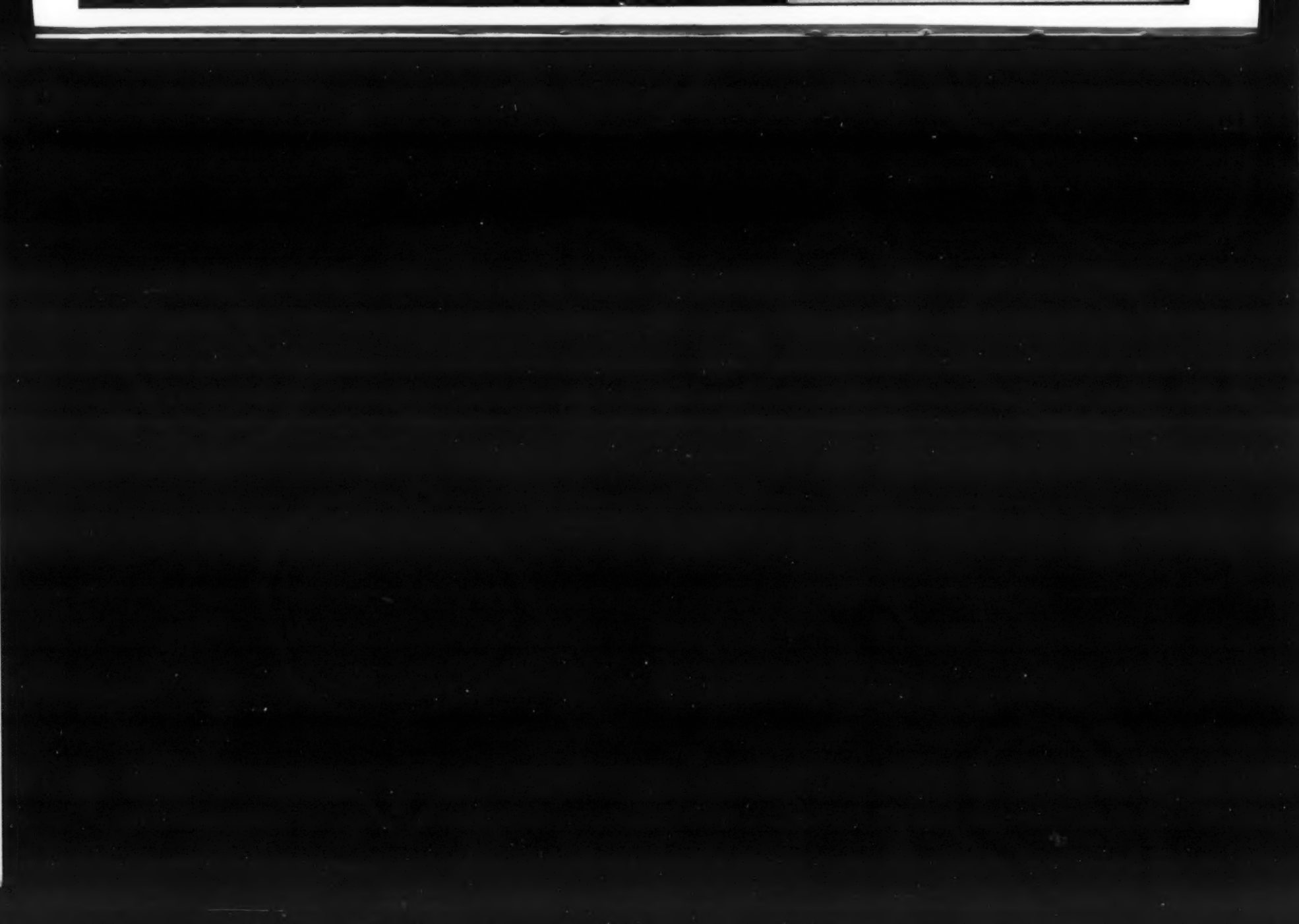
3½ and 5 h.p. motors in 24" and 36" sizes. The 3½ h.p. motor requires 90 cu. ft. of air per minute, the 5 h.p. motor, 150 cu. ft., each at 90 lbs. pressure per sq. in.

DISSTON ELECTRIC CHAIN SAW SHARPENER

Enables you to do your own sharpening . . . quickly, easily, accurately. Keeps chains in first class condition.

Write for full particulars, or see your Disston Distributor, who carries complete stocks of parts and is prepared to render prompt and expert service.

HENRY DISSTON & SONS, INC., 1164 Tacony, Philadelphia 35, Pa., U.S.A.



Warden of Troublemakers

A group of the trouble-makers which yield to accurate Nalco System control methods.

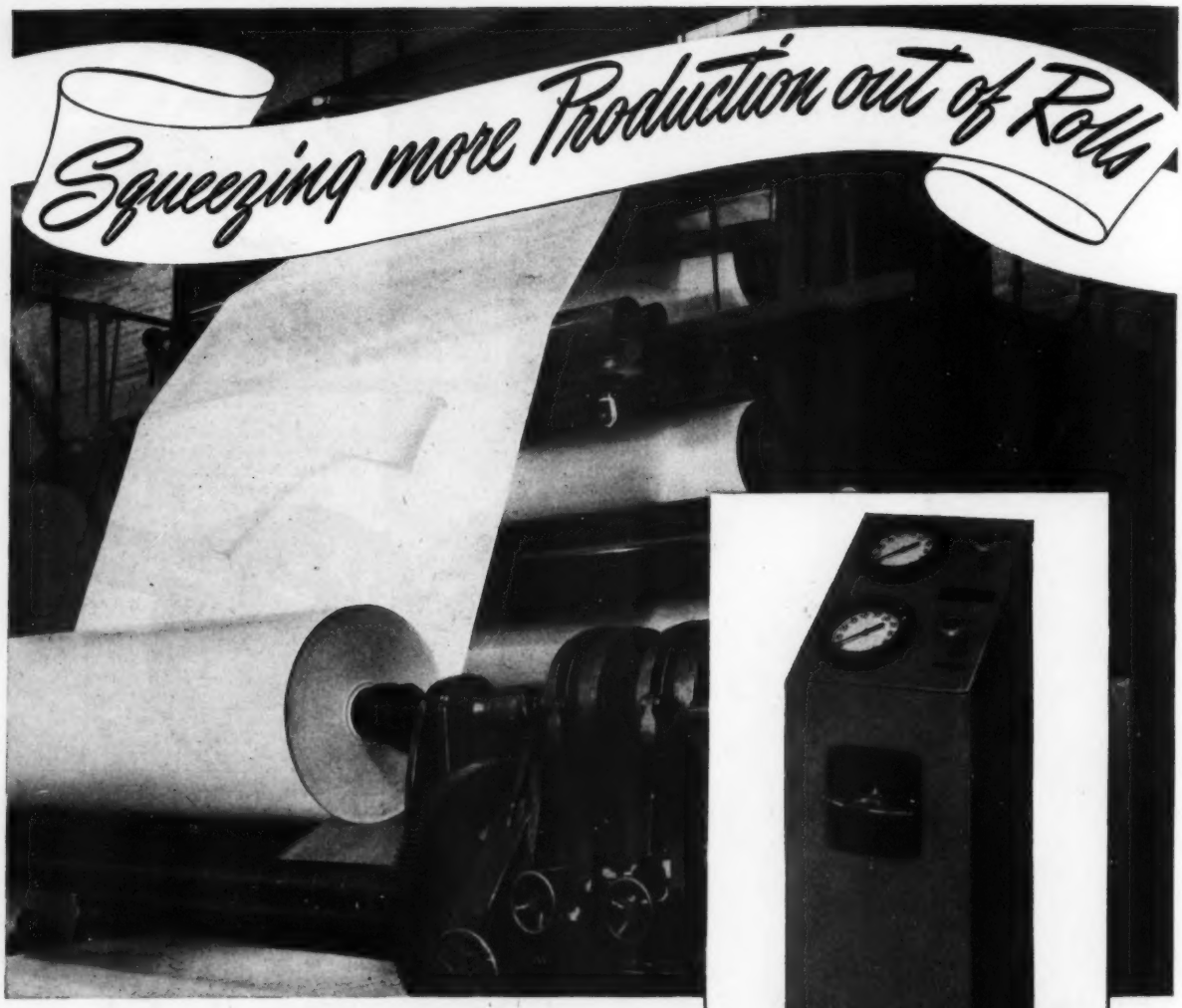
This scientist in the Nalco Microbiological Laboratories is a warden of troublemaking micro-organisms in pulp and paper mills throughout the country. His close checks of water samples sent in by users of the Nalco System insure that Nalco slime control treatments are getting results—and that they are quickly adjusted to take care of variations in the type or count of slime-forming micro-organisms present in the mill.

Check with your Nalco Representative on the multiple advantages of the complete Nalco System for your mill — or write direct for Nalco Bulletin No. 36 on slime control for pulp and paper mills.

NATIONAL ALUMINATE CORPORATION
6232 W. 66th Place, Chicago 38, Illinois
Canadian inquiries should be addressed to Aluminate Chemicals, Ltd. 555 Eastern Avenue, Toronto 8, Ontario

Nalco

The Scientific System of Water Treatment for Pulp and Paper Mills



FOXBORO PNEUMATIC LOADING

● *ON CALENDARS,* Foxboro Pneumatic Loading maintains better and more uniform finish, with fewer breaks. *On press rolls,* it assures maximum moisture extraction, and *uniform* extraction across the sheet.

This modern roll-loading system gives calibrated cushioned roll pressure with convenient fingertip control . . . a turn of an air switch to load, unload, or lift the roll; a turn of two knobs to adjust exact pressure at each end of roll. Then, constantly uniform air pressure compensates for variations in material thickness, and for out-of-roundness of rolls—snubs tendency to bounce. Thus higher roll speeds with less broke are practical.

Here's a proven method for improving quality, for extending felt and roll life, and for saving steam. Get complete facts. Write for Bulletin B306. **The Foxboro Company, 158 Neponset Ave., Foxboro, Mass., U. S. A.**

In this new, streamlined Foxboro Control Cabinet, adjustments in load, venting, and reloading of air cylinders, or lifting of the top roll, are accomplished without lost time or physical effort. Cabinets are available in single and dual units. Instruments for remote recording of loading pressures can also be furnished if desired.

FOXBORO REG. U. S. PAT. OFF. **PNEUMATIC LOADING**

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Montana*

WEALTH OF MINERAL DEPOSITS
IMMENSE COAL RESERVES
LARGE LUMBER PRODUCTION
AVAILABLE WATER POWER
ABUNDANT LIVESTOCK
VALUABLE WOOL CLIP
VARIED AGRICULTURE
TREMENDOUS WHEAT YIELD
SCENIC BEAUTY

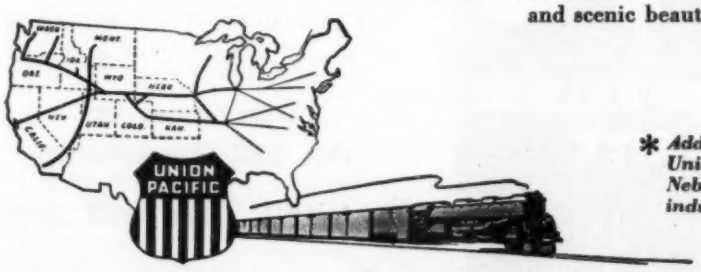
* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

Known as the "Treasure State," Montana is richly endowed with raw materials essential to industrial production. Among the many metallic minerals are silver, copper, lead, manganese, chromium and molybdenum. Coal reserves have been estimated at over 400 billion tons. The majority of the state's cities are supplied with natural gas.

Montana is a top producer of cattle and sheep, the annual sheep production being approximately two million head with a wool clip of great value. In agriculture, wheat takes first rank among grains. Sugar beets, potatoes, together with other vegetables, are grown on its farms. There are many thousand acres of forests, principally pine.

The Union Pacific Railroad serves Butte in the heart of the great mining area, and West Yellowstone—most popular rail entrance to the famous Yellowstone National Park.

Montana welcomes new industry. It has the space, materials, facilities and manpower to encourage firms seeking new locations. Additional advantages are good living conditions, an excellent educational system and scenic beauty.



* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

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THE STRATEGIC MIDDLE ROUTE

21st Exposition of Chemical Industries

DEC. 1-6

GRAND CENTRAL PALACE
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Management International Exposition Co.

A WEALTH OF NEW IDEAS FOR PAPER MAKERS

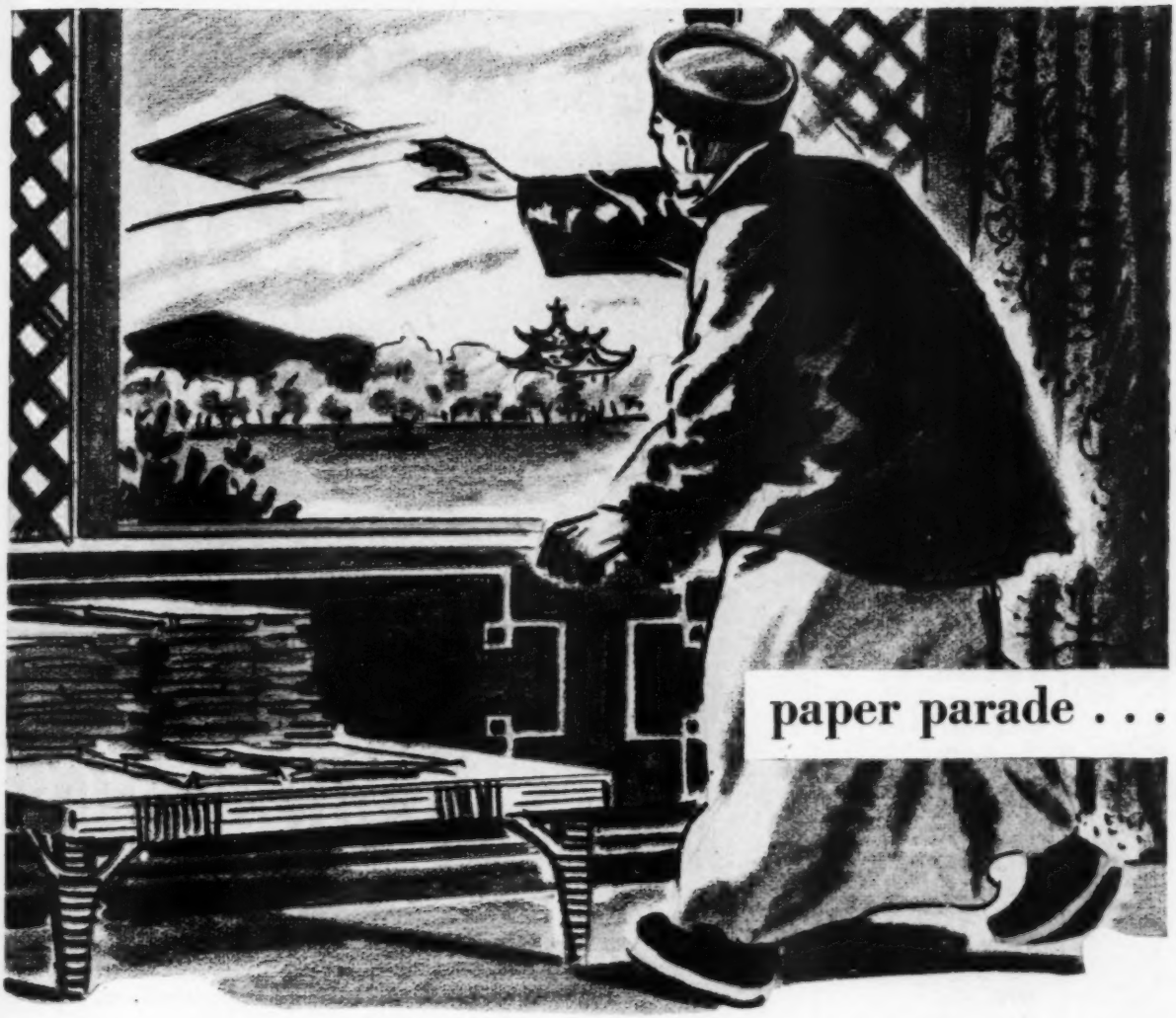
New ideas were never so important in the Pulp and Paper Industry as now . . . with rising costs and stiffening competition calling for better methods and materials to perform paper making operations at lower cost . . . to improve products . . . step up production. You'll get new ideas . . . plenty of them . . . more than ever before . . . at the 1947 Chemical Exposition. 340 exhibitors will show and demonstrate latest techniques, equipment and supplies developed to stimulate progress in chemical processes. Technical representatives will be there to assist you in adapting these latest advancements to paper making operations.

From things you see here . . . from new ideas you pick up in talking with other technical men on hand to help you . . . may come the answer you have been seeking on baffling problems. Many hundreds of paper mill men found the previous exposition extremely worthwhile . . . visited it over and over again. By staying abreast of all that is new in all phases of the industry, you'll help to keep your company ahead . . . and yourself, too.

So mark the date on your calendar NOW. It's an event you can't afford to miss.

Don't pass up this BIG Opportunity

You'll say, "time well spent"



According to the American Forestry Association, the credit for making the first paper from vegetable fiber goes to Ts'ai-lun, of China, a member of the court of the Han dynasty in the year 75 A.D. Losing patience with the bamboo tablet and stylus then in use, he set himself to the task of making "paper" from mulberry bark and rice. P.S. It took him thirty years.

The scholar lost his patience and an industry was born!

FINER PAPER — faster — is the objective of the progressive paper industry today. And the production of high-grade *coated* paper, at the speed required by modern conditions, calls for a Calcium Carbonate of high quality.

Wyandotte Precipitated Calcium Carbonate has proved its superiority — in brightness and uniformity . . . in smoothness, hiding power and ink absorption. Because it is made of pure ingredients, it contains no grit or other abrasive and is readily and easily dispersible in water.

For many years, Wyandotte Chemicals Corporation has made a business of furnishing the paper industry with the finest in Precipitated Calcium Carbonate.

Wyandotte recently completed a great new $2,000,000 plant to provide more of this superlative coating pigment so much in demand by the paper industry.

FOR TECHNICAL BULLETINS WRITE:

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WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine • Hydrogen • Dry Ice • Glycols
Ethylene Dichloride • Propylene Dichloride • Chloroethers • Aromatic Sulfonic Acid Derivatives • Other Organic and Inorganic Chemicals

Wyandotte
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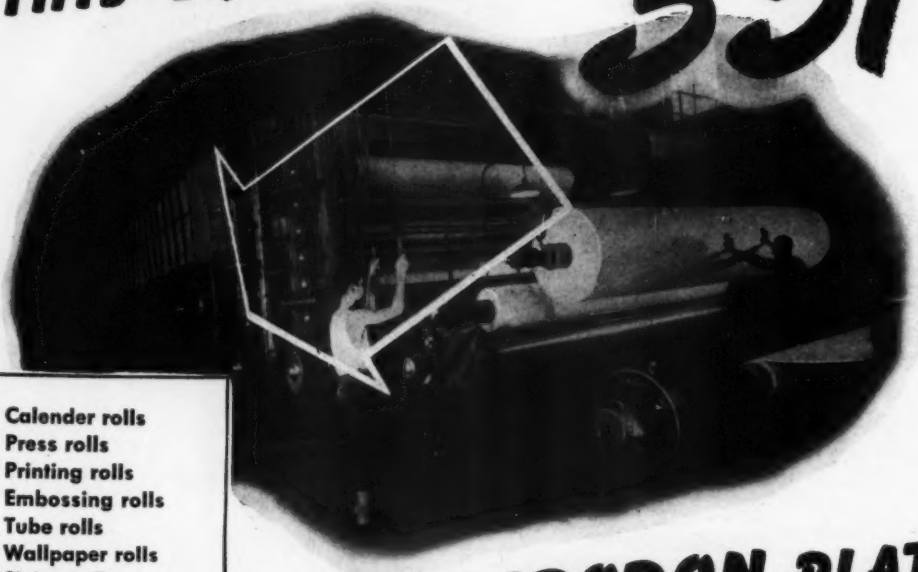
INCREASE AVERAGE PRODUCTIVE LIFE OF THIS EQUIPMENT 331%



- Calender rolls
- Press rolls
- Printing rolls
- Embossing rolls
- Tube rolls
- Wallpaper rolls
- Sizing rolls
- Pasting rolls
- Breaker rolls
- Sweat rolls
- Creping rolls
- Table rolls
- Carrying rolls
- Idler rolls
- Drying rolls
- Couch rolls
- Screen plates
- Slice lips
- Guide bars
- Suction box covers
- Evaporator tubes
- Pump parts
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- Fourdrinier wires
- Shake rails
- Tanks
- Mixing kettles
- Knives

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Here's how CRODON (industrial chromium plating) prolongs the life of your paper mill equipment. Application of chromium plate produces an intensely hard, smooth, protective coat on practically all base metals. It resists wear and abrasion. It retards corrosion. It insures more efficient machine performance. Replacement costs are saved. Operating delays are prevented. Improved paper quality is assured.

CRODON plating of your paper mill equipment will be done in the quickest, most efficient, and economical manner possible. When you operate with CRODON-plated machinery, you produce better paper at less cost.

Detailed information will be sent on request, or we shall be glad to discuss CRODON plating with you personally. Call or write the nearest plant.

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The Chrome Plate

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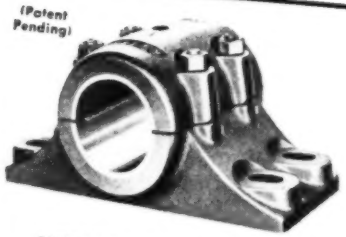
"Precision Built" to a high degree of accuracy. Caps and bases are accurately ground before babbitting. Bores are broached and the ends of all bearings faced with caps bolted in place, assuring correct alignment and fit. Hard fibre shims between cap and base provide adjustment for wear.

Caps are drilled and tapped for grease cups or high pressure lubrication fittings. A groove in cap provides ample grease storage while grooves at the split properly distribute the grease over entire length of bearing surface.

Available for shaft sizes from 5/8" to 5".

(Patent Pending)



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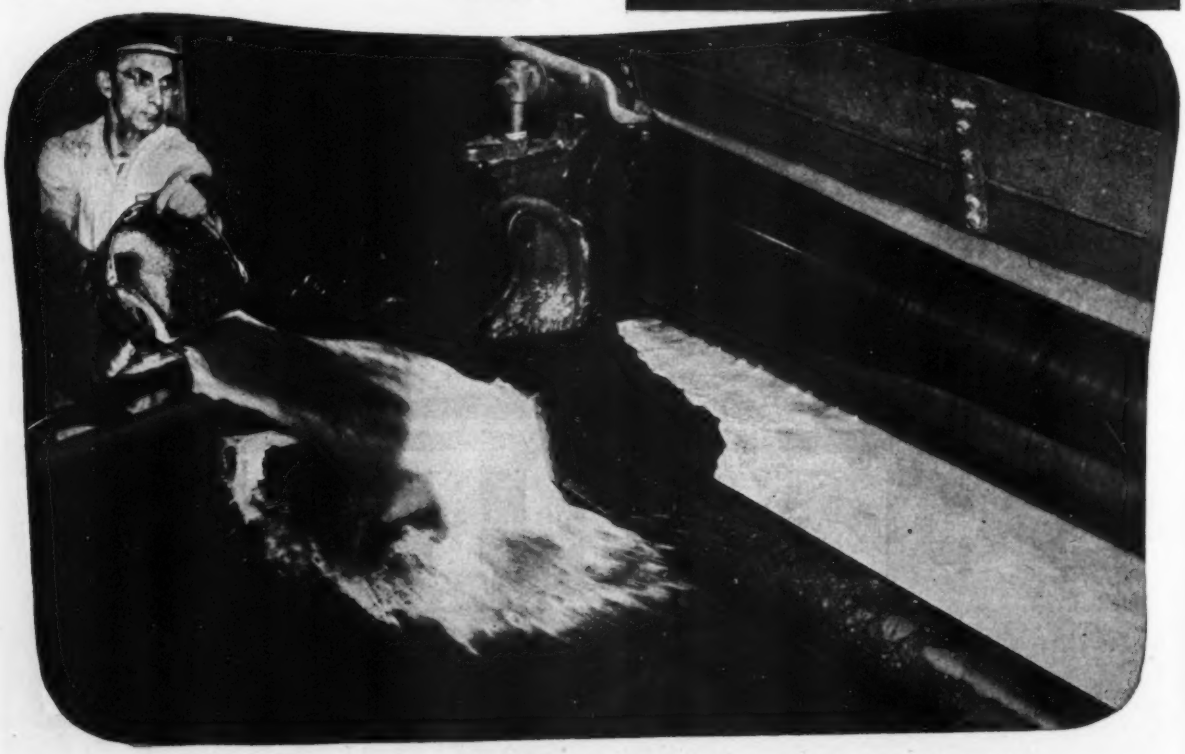
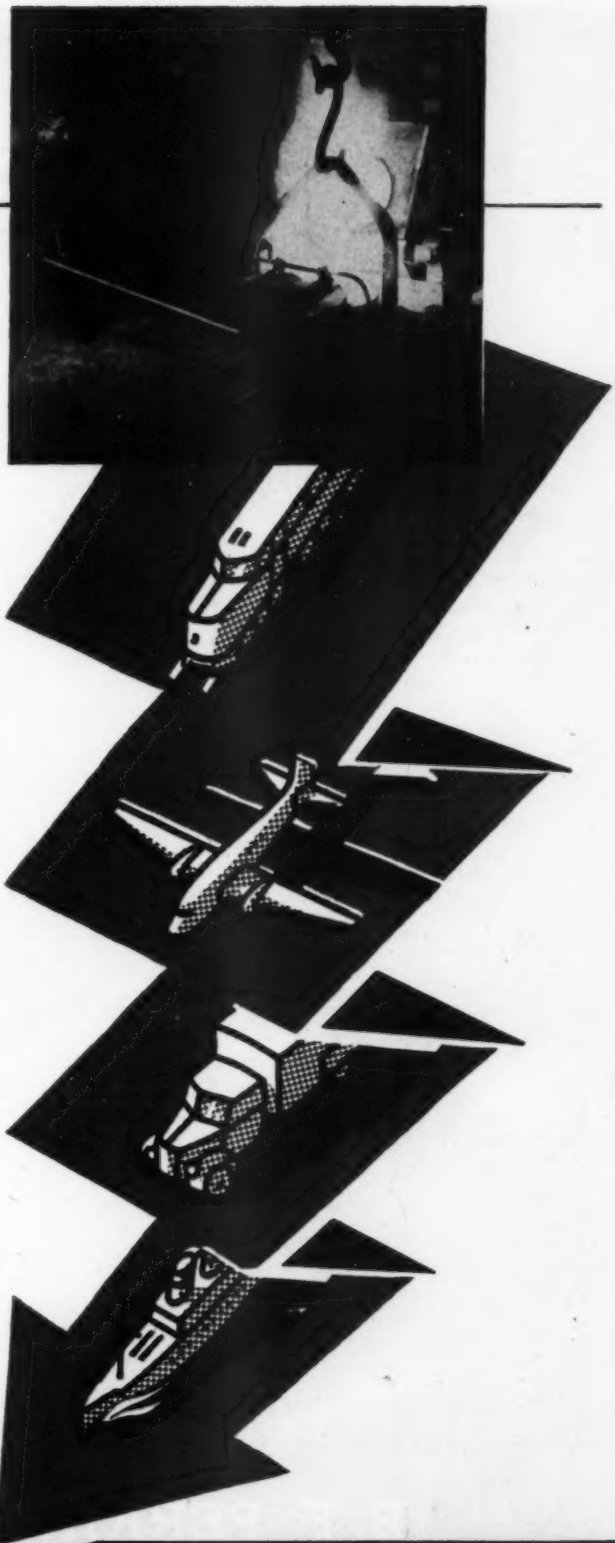


Photo Courtesy of Whippany Paperboard Company, Whippany, N. J., April 27, 1947



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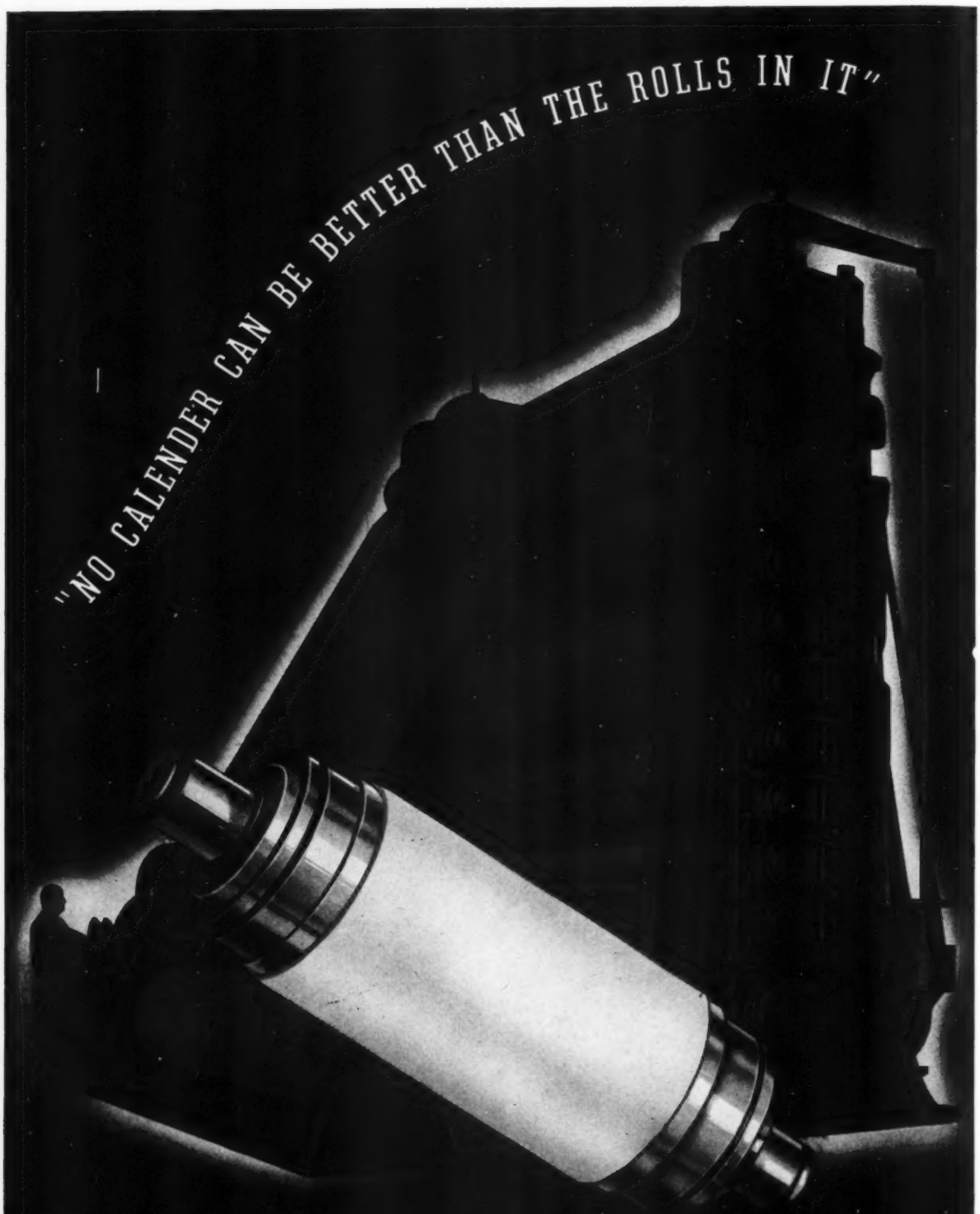

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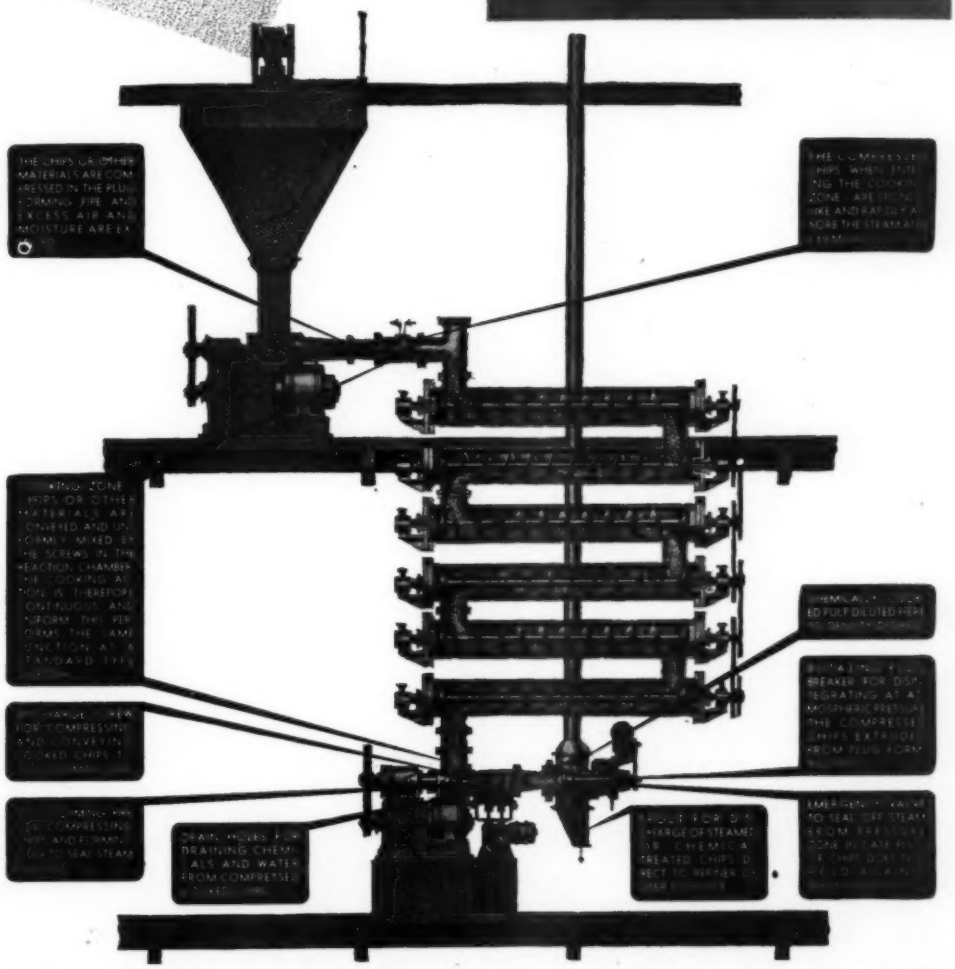

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NOVEMBER 1947

PHOTOMICROGRAPHS

for Appraising Paper Surfaces

JOHN F. HALLADAY, Consultant

▶▶▶ THE PRINTING INDUSTRY of the United States spends about fifty-five million dollars for printing ink each year. Presswork often costs one and a half to five times the cost of the ink itself. Paper costs alone are often ten or twenty times the cost of the ink. Altogether, ink, presswork, and paper probably represent an annual expenditure of five billion dollars. Yet, to the final consumer, the real value of this five billion dollars worth of printed product depends greatly on how attractively and legibly this fifty-five million dollars worth of ink is applied to paper.

Paper smoothness greatly influences finished quality as well as ink and pressroom costs. Almost all parts of the papermaking process are aimed toward the development of a smooth surface on the finished product. The final calendering is the last of a chain of treatments directed toward smoothness and is designed to obliterate or modify the surface imperfections introduced by shortcomings in the earlier steps in the process. Less calendering is needed as we come nearer to perfection in furnish, beating, forming, and drying the sheet prior to entry into the calender stack. And the less we resort to calendering, the greater the area of paper we can deliver for each ton of raw materials poured in at the beater room. While paper is sold by the *pound*, we read books and periodicals by the *page;* we use stationery by the *ream*, and folding boxes by the *thousand*—all measures of *area*, not weight. The news dealer's sign reads, "Post—Out Today—10 cents," not "Today's Post, fourteen ounces for 10 cents." To the extent that we get high smoothness at low basis weights, we give the consumer what he wants at lower cost. Paper surface photomicrographs can help us to do this.

Photomicrographs can be of great value in appraising and recording the results of beating, forming, wet-pressing, drying, coating, and calendering techniques.

Microscopes long have been used by the papermaker. Fiber studies by transmitted light are practically indispensable. Papermakers, inkmakers, engravers, and printers constantly use low-powered magnifiers as aids in solving their daily production problems. But despite their great potential value, photomicrographs are still not widely used. Their great superiority over the common visual methods of examination is not yet generally appreciated.

One can learn much merely by looking at a paper surface through a microscope. The value of what he learns depends on how he has selected his sample, how he lights it, and how he focuses his lenses. Unless all three are done well, his conclusions are apt to be in error. Even when a capable observer has made his examination, he will still find difficulty in conveying his conclusions to others who have looked at the same sample under the same conditions, but through different eyes and against a different mental background. Earmarking for discussion a certain point on the sample is often difficult, and it is almost impossible to demonstrate quantitative measurements to other visual observers. Without a photographic record, comparison between samples produced at widely-separated times is unreliable or impossible. When visual observation shows the need for investment in new equipment, the lack of permanent records that show the basis for expenditure is often a very real hindrance to the executive who must approve or deny the appropriation request.

Photomicrographs reduce or eliminate these difficulties. Perhaps their greatest value lies in the way they promote understanding and agreement between those concerned with a problem. On this basis alone, they should be used more widely.

Optical Apparatus

Photomicrographic cameras can be purchased from dealers in optical goods. Certain photographic enlargers are especially designed for copying photography and the best of these are well adapted to the making of surface

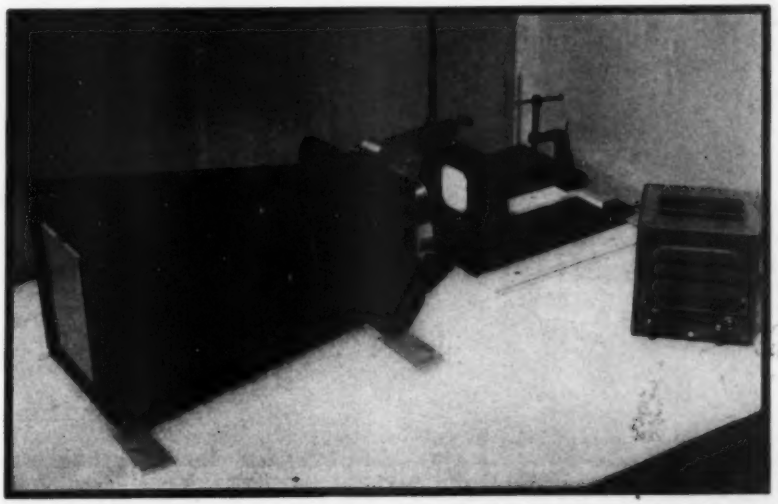


Fig. 1—Apparatus used for making obliquely-lighted photomicrographs of paper surfaces

photomicrographs. The advice of a well-informed dealer in photographic equipment is a great help when deciding what equipment to buy. It is neither necessary nor desirable to have high degree of magnification from sample to negative. The author prefers a magnification of four or five diameters between sample and negative. This negative is then used to make bromide projection prints up to thirty or forty times the diameter of the original paper sample. By using this two-step method a greater depth of field is gained in the first step than would be obtainable with the greater initial magnification essential to any one-step method.

For those who prefer to build the apparatus, Figure 1 shows a typical camera design. A Carl Zeiss Tessar lens with a focal length of 50 millimeters produces an image on the film about five times the diameter of the sample area. The superior resolving power and flatness of field of the four-element Anastigmat is desirable, but cheaper lenses may be used if worked at very small *effective apertures* such as f/64 or f/128. Note that the aperture marks put on the lens by the maker are accurate only when the lens is focused on a subject at an infinite distance and is thus working at its specified focal length. In photomicrography this requirement is not remotely approached, for the sample is very close to the lens itself. If F is the focal length of the lens, D is the distance from the optical center of the lens to the sample, and d is the distance from the optical center of the lens to the film or plate, then

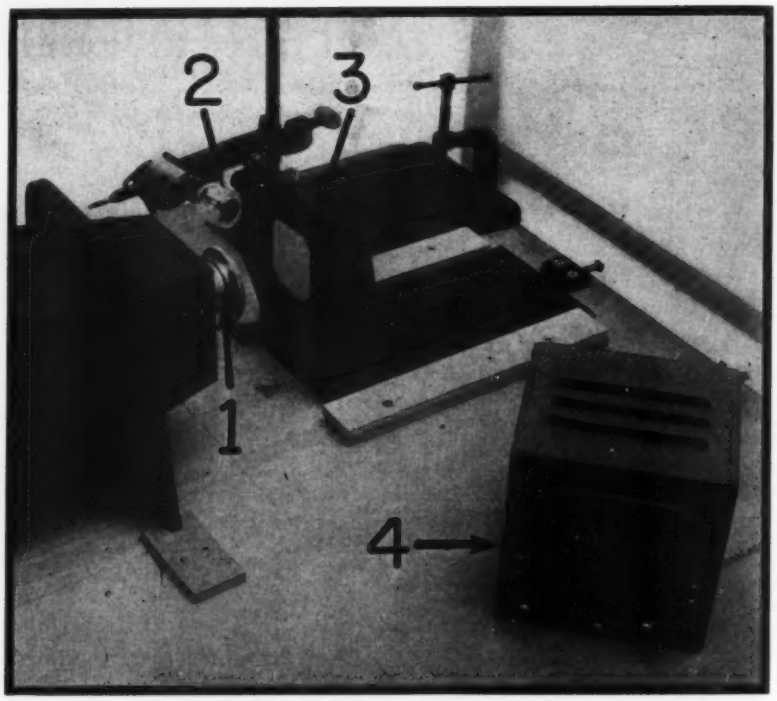


Fig. 2—Close-up of photomicrographic apparatus showing (1) lens, (2) concentrated arc lamp, (3) sample stage, (4) power supply for concentrated arc

$$\frac{1}{D}+\frac{1}{d}=\frac{1}{F} \qquad \ldots\ldots\ldots\ldots (1)$$

closely expresses the relations for a thin single element meniscus lens and

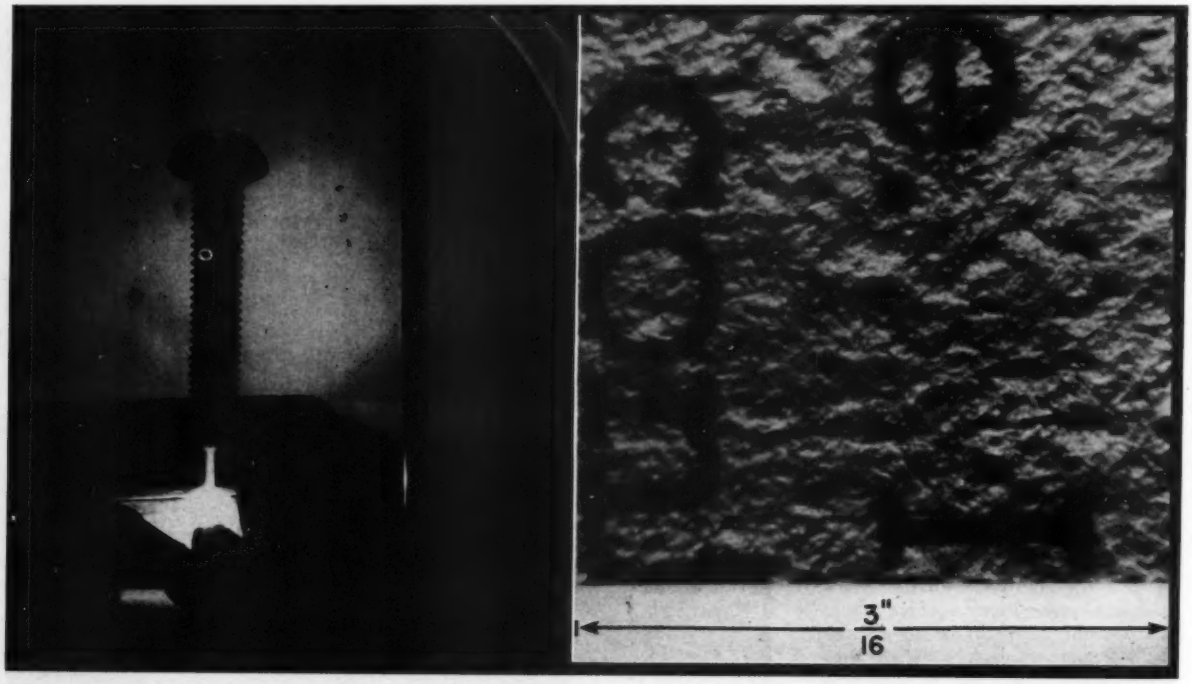


Fig. 3 (left)—Photo demonstrating sharpness of shadows cast by the .003" diameter concentrated-arc. The arc casts the shadow of a 10/32 machine screw on a white screen. Distance from arc to screw is 2 inches. Distance from arc to screen is 12 inches . . . Fig. 4 (right)—Surface photomicrograph of a typical antique finish book paper. Actual dimensions of the original sample shown by arrows

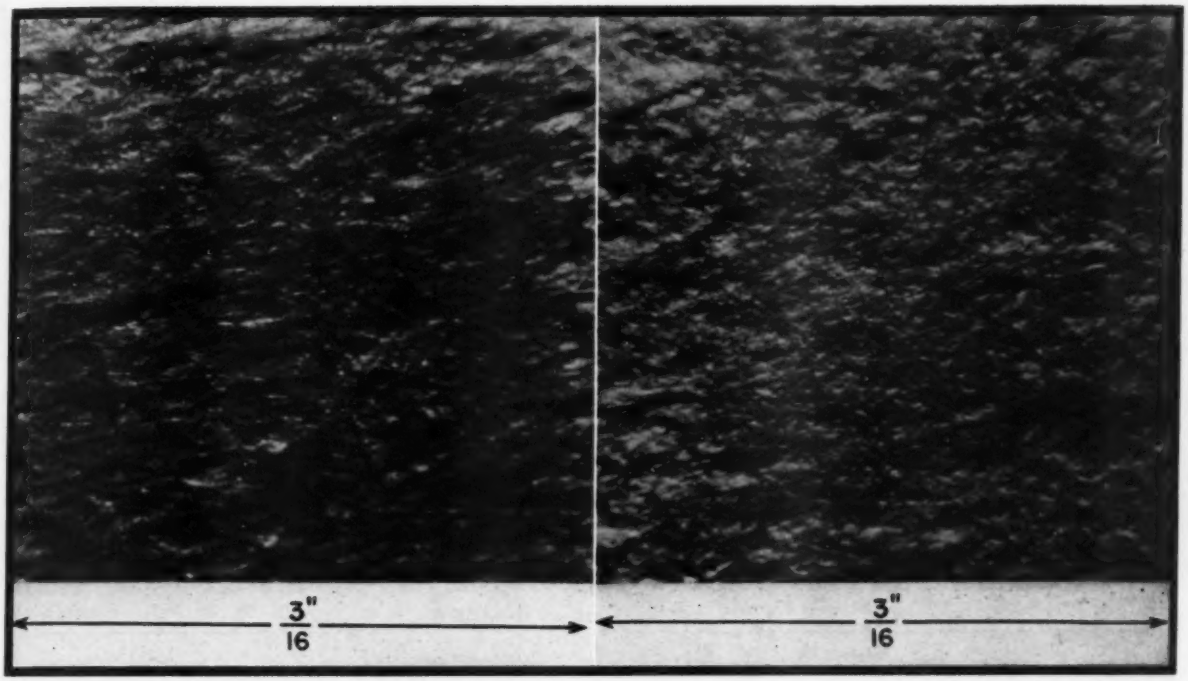


Fig. 5 (left)—A typical patent coated boxboard as finished on regular chilled-roll board machine calendar stock . . . Fig. 6 (right)—A typical machine coated boxboard coated with metal roll and metal blade doctor. Steel calender finish

is a practical approximation for the more complex multiple element lenses.

For any subject-to-lens distance, D, the true working aperture of the lens is

$$A = \frac{\frac{d}{F}}{S} = \frac{dS}{F} \quad \ldots\ldots\ldots (2)$$

in which S is the stop number placed on the lens mount by the maker. By equation (1), when D is at infinity, d must substantially equal F and equation 2 becomes

$$A = \frac{dS}{F} = \frac{FS}{F} = S \quad \ldots\ldots (3)$$

and, under this condition only, are the maker's stop numbers identical with the true working aperture. In photomicrography this is not the case, for D is relatively very small. For example, when the magnification is 5 diameters, $d = 5D$. Assuming $F = 75$ mm., equation 1 becomes

$$\frac{1}{D} + \frac{1}{5D} = \frac{1}{75}$$

which solves $D = 90$ mm., and $d = 450$ mm. Substituting these values in equation 3 yields

$$A = \frac{\frac{450}{75}}{S} = 6S$$

Since, all other factors held constant, the time for exposure is proportional to A^2, calculating the exposure time from S rather than A would result in an error of 3500 per cent.

The foregoing equations are practically indispensable for calculating camera designs, magnification ratios, and the exposure times surrounding any proposed camera design using a certain lens. They do not, of course, evaluate resolving quality of the lens itself. In the case of new, unused lenses, the manufacturer's rating may sometimes be available. In the case of second-hand lenses, this rating if obtainable may prove unreliable if the lens has been disassembled and reassembled by those not trained in this often very exacting operation. In such cases, it is well to arrange for a purchase on approval, final acceptance contingent on the results of actual trials.

Any camera design must provide for some focusing flexibility to take care of differences in the thickness of the samples. In Figure 2, No. 3, this is provided by a movable stage to support the sample. In this way, a convenient way of focusing is provided.

Lighting the Samples

The quality of the light used to light the sample and the angle at which the rays meet the surface of the sample are extremely important. The ideal light source is one where practically all the rays emanate from a point-source of such brilliance that all rays can be made to meet the paper surface at practically the same angle. This rules out the use of ordinary bare electric light bulbs because of the wide area devoted to filaments. The diffuse quality of such lighting makes many important surface imperfections invisible in the final print. Fairly good results can be obtained by lighting the sample with the focussed beam from a small photographic transparency projector although this only approximates the ideal point-source.

Probably the closest approach to the ideal light source was described by W. D. Buckingham and C. R. Deibert (1) in 1946. This electronic concentrated-arc lamp developed by the electronics division of the Western Union Telegraph Company is a very close approach to the requirements. The arc lamp itself is shown as No. 2 in Figure 2. The power supply for the arc is shown as No. 4 in Figure 2. The lamp shown develops about 100 candles brightness per square millimeter and the arc itself has a diameter of about .003 inch. This high-intensity arc provided the practically point-source illumination for all the photomicrographs accompanying this article. To show the remarkable quality of light produced by this light source, the photograph shown in Figure 3 was made. The caption for Figure 3 is self-explanatory.

The angle at which the rays of light strike the sample is a very important factor in both quantitative and quali-

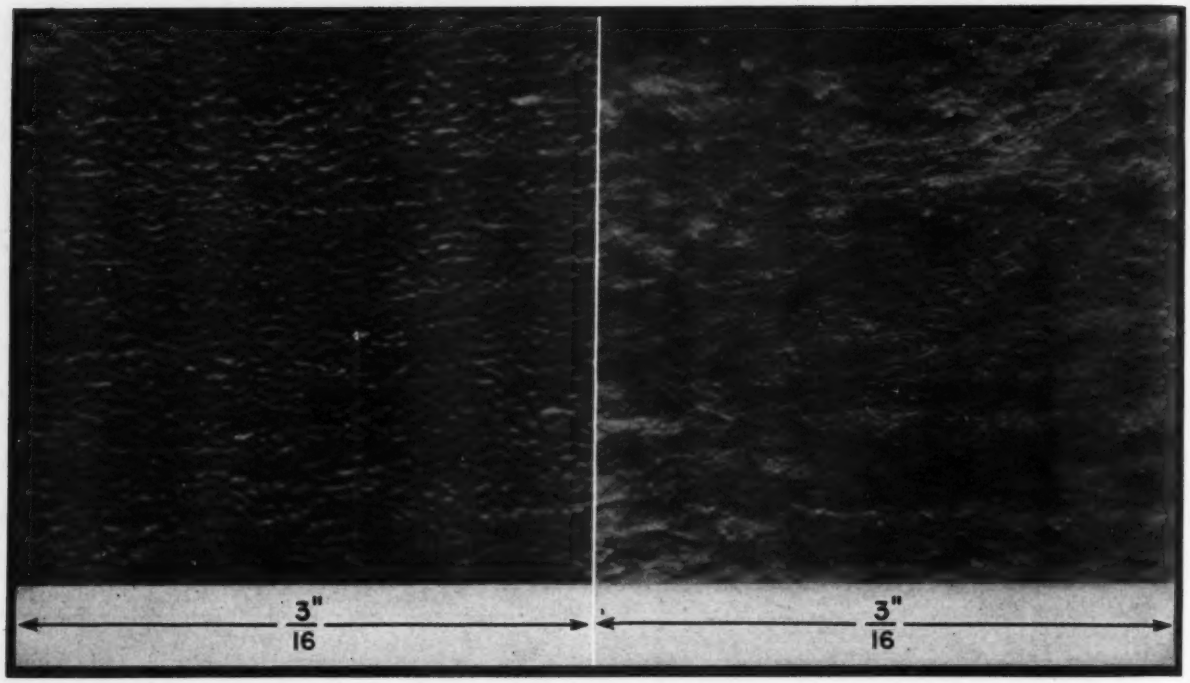


Fig. 7 (left)—Typical machine coated boxboard coated with rubber-rolled printing type coater. Steel calender finish . . . Fig. 8 (right)—Typical air-knife coated boxboard. Coat weight solids at 2 pounds per thousand square feet. Filled-roll supercalender equipment

tative appraisal of paper surfaces. The maximum possible angle between the paper surface and the light rays is 90 degrees and the minimum possible angle is slightly greater than 0.0 degree. Between these extremes lie an infinite number of choices. As the angle of illumination approaches 90 degrees, even quite rough surfaces will appear quite smooth. As the angle is reduced to approach 0.0 degree, even the smoothest papers will appear quite rough. The senstivity to surface irregularities increases as the angle of illumination is reduced. For most paper surfaces the writer finds an angle of 8 degrees most satisfactory. All of the photomicrographs accompanying this article were made under this lighting angle. To have any value for comparison between two paper surfaces, the lighting angle must be the same for each. For example, the natural tangent for the angle 8 degrees is 0.1405. Under this condition, any shadow cast by a surface irregularity would be

$$\frac{1}{.1405} = 7.1$$

times as long as the difference in height which caused it. The amount of shadow area is thus a fair qualitative indication of surface roughness but valid for comparison between two prints only when they result from the same angle of illumination.

When looking at surfaces in photomicrographs it is very important to know from which direction the light is directed toward the sample. When this factor is not taken into consideration, some rather amusing but sometimes seriously misleading errors in interpreting are encountered. For example, almost all observers when viewing Figure 6 see it as a more or less rough surface with many small pits distributed at random. If this magazine is turned upside down and Figure 6 again is observed, what first appeared to be pits will appear as small hills rising out of a rather rough plain. This interpretation is entirely in error and is practically an exact opposite to the true condition. Most normal individuals when looking at such illustrations naturally assume that the light source is at the top of the page and, even when the page is reversed, this psychological habit persists. This example shows how essential it is to so mark the original negative that the direction of lighting is known. Prints from it should also be marked in such a way that they can be oriented with the light source at the top of the print, when being viewed. A simple way of doing this as well as identifying a particular sample and the scale of magnification is available. Page numbers from any magazine are pasted within the sample area and are photographed onto the original negative. Care is exercised to see that one dimension of the magazine paper is always (say) one-eighth inch. The final negative will then carry sample identification, magnification ratio, lighting direction, and approximate angle of lighting.

Sensitive Materials and Laboratory Methods

For most problems, ordinary orthochromatic film can be used in the camera. Except for colored samples or where greater emulsion speed is required, panchromatic film offers no advantages. It requires greater care in handling in the darkroom because of its wider range of color sensitivity. Whenever the final print is to be over three or four times the negative size, fine-grain developing techniques should be used. The author has found Defender *777* and Eastman Microdol developers satisfactory for normal contrast on orthochromatic emulsions. When greater contrast is desired, process orthochromatic films may be used. A wide range of desired results can be obtained through intelligent selection of sensitive materials and developers. The small 25 cent Kodak Data Books on *Formulas and Processing* and *Negative Materials* published by Eastman Kodak Company and sold by most photographic supply dealers contain a wealth of information on these subjects.

Exposure Information

No complete exposure guides can be given due to the complexities introduced by different emulsions, different developers and different developing

(Turn to page 1136)

White-Collar Morale . . .
a Problem in Human Relations

O. C. COOL, Director
Labor Relations Institute

▶▶▶ AN ANALYSIS of the situation of white-collar workers in industry and business will show on the favorable side that many firms have made substantial adjustments in office payrolls since the elimination of wage stabilization.

It also reveals that severance pay is being taken more and more for granted; that the trend is very much toward employee benefit plans of one kind or another; and that provision is being widely made for sick leaves, maternity leaves and the like.

On the unfavorable side are pay inequities and the apparent inability of management to unbend, to let its hair down—and treat office personnel *like people.*

Eliminating Pay Inequities

Why is it that so many office workers receive less than others for performing similar tasks? Putting it another way, why do two stenographers in the same establishment often do far different jobs, entailing a great divergence in responsibility—but for the same size paycheck? It is no answer to say, "Mr. Jones dictates very few letters, so his stenographer takes care of all his records, while Mr. Smith's stenographer just handles correspondence." This reply shows us *why the jobs are different*—but does not explain why one girl is paid the same rate as the other.

The true reasons for such inequities is that few companies have had the foresight to place their white-collar jobs on a sound, scientific basis. Job evaluation, which is the standard, recognized procedure for regulating the pay of production employees, has made very little progress as a tool for setting office and other white-collar salary scales.

The *techniques* of job description, job analysis and job rating are known to most controllers, and especially to those who have encountered these methods in connection with production pay schedules. Here are the advantages which would accrue from job evaluation in the office:

1. Job evaluation will give a balanced salary structure, so that workers with similar skill, responsibilities, working conditions and other factors will rate similar pay.

2. It will cut down on the greatest single source of employee dissatisfaction.

3. It will provide a minimum and maximum rate for each job—thus enabling the establishment of a uniform raise and promotion policy.

4. It will make it easier to set the scales for new jobs.

5. If and when salary reductions become essential, they can be made on a uniform, scientific basis.

6. It will show which jobs are overpaid, which underpaid, and thus provide an opportunity to correct injustices.

7. It will aid in the selection and recruitment of personnel, because job evaluation always determines job requirements.

Needless to say, white-collar job evaluation—like that in the production divisions—is no task for amateurs, however well-meaning they may be. It calls for an individualized study of each and every task, and is the province of the specialist—the expert with an outside viewpoint, free of conscious or unconscious loyalties or bias. In such hands, the program is bound to succeed.

Humanizing Personal Relations

Far more than in a workshop or factory, human relationships count decisively in the minds of office personnel. The improvement of such relations centers on two foci—the humanizing of attitudes and the elimination of grievances. One is a highly personal function, the other a device which works best if it is formalized and made as impersonal as possible. The contradiction is more apparent than real.

Many office managers and higher executives take it for granted that, because they are in daily or hourly contact with their subordinates, any grievance would naturally "out" of itself. Actually, it works the other way. Lack of complaints is more a sign of repressed resentment than it is of no resentment at all—and if no impersonal channels for expressing such feelings are provided, they are almost certain to be held back until they literally erupt. That is why unadjusted grievances are responsible for so much employee discontent.

There are three steps in the Institute Approved Plan for handling office grievances, as follows:

Step 1. If any employee has a grievance, no matter what the cause, and he feels the management should do something about it, he has the right—and should be encouraged—to lay the problem before his supervisor.

Step 2. If the first step does not result in a solution, it should be automatically up to the department head to take over and adjust the difficulty. This is the point at which many grievance settlements fail, being stymied by the inability of the supervisor to bring forth a solution, and by the employee's natural unwillingness to go over the boss's head. This explains why every grievance should be recorded at the supervisory level—to give the department head a chance to ask how things worked out.

Step 3. If the matter remains unsolved, it should then be up to the personnel director or other designated executive to review the entire case—either by examining the records or interviewing the parties—and come to a final decision. Some large companies make use of grievance committees to act as a final court of appeal.

Whenever an appeal is taken, it should be a standing rule that, regardless of who makes the final decision, the employee should be informed about it by his supervisor. This is important in preserving authority and keeping "channels" clear. Otherwise, far graver difficulties may arise.

It is essential, too, to remember that no grievance is really settled unless (1) the aggrieved employee is convinced that he received a square deal, and (2) unless the supervisor feels that he was not compromised or unjustly treated by those to whom appeals were made. Equally important, keep *delay* from complicating the process. A supervisor should make his decision known to the employee within 24 hours of receiving the complaint. A department head should take no longer than three days, if he intervenes in the matter. If appealed still higher, the final decision should be forthcoming within five days at the utmost.

The morale factor is largely one of good human relations—of cheerful, friendly, mutual give and take. Too many of us err in knowing—and caring—too little about the other fellow and his family, friends and problems.

(Turn to page 1136)

LIME RECOVERY

*in the Sulphate Pulp Industry—Part 2**

W. H. TOCK, Engineer
Pyro-Processing Section
Allis-Chalmers Mfg. Co.

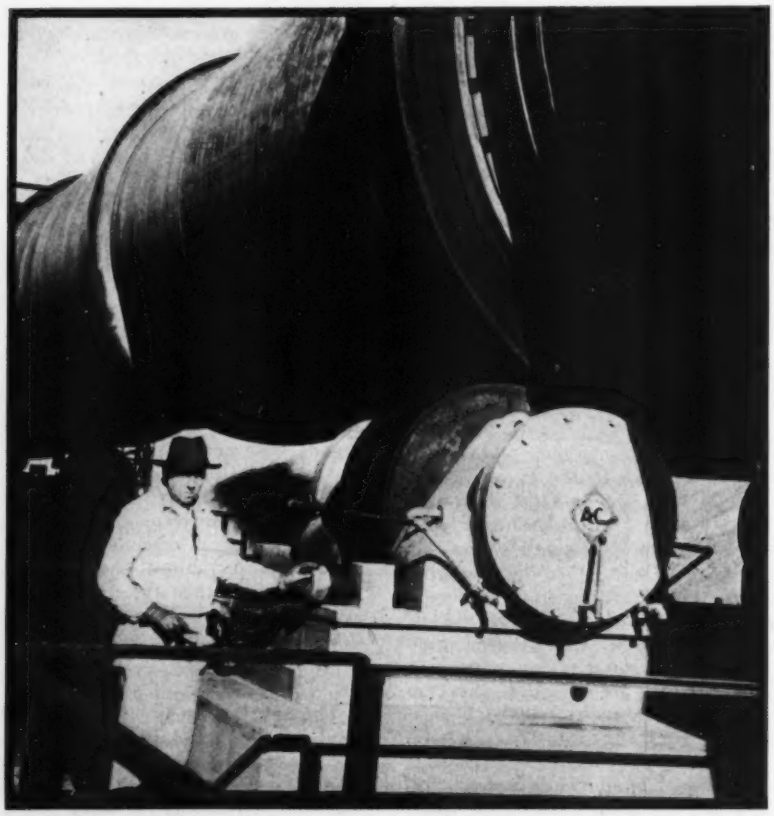
▸▸▸ FUEL CONSUMPTION would be reduced further if coolers were used following kilns (a regular procedure in the commercial lime or cement industry). Considering that there would be recoverable 50 to 60 per cent of the heat in the material as discharged from the kiln, this would represent a reduction in fuel required of approximately three gallons of oil per ton of lime. For 100 tons of lime per day, with oil at six cents per gallon, there would be a saving of oil equivalent to $18 per day, which would pay for the required cooler and accessory equipment in approximately eight years.

COOLERS

Inasmuch as it is not actually necessary to cool the lime for further handling, lime is slaked hot in most mills for this reason and others. Some of the heat in the lime is useful in maintaining the temperature of the slaking liquor aiding the reaction. Hot lime slakes more readily and decreases the retention time necessary for causticizing.

Slaking hot lime aids the settling rate of the carbonate.

Lime sludge, in passing through a rotary kiln, will agglomerate into pellets of an average size about ½ in. They retain this shape in calcination and discharge as fairly dense pellets. These pellets when hot, are fairly resistant to degradation in handling in the usual drag conveyor. However, in cooling, the pellets are less resistant to degradation and in cooling in the older more common open type rotary coolers, the action would break the pellets causing considerable return of dust to the kiln.



Installation view of carrying mechanism showing cooling water piping and adjusting screw

Fine dust returning to the kiln with the heated air interferes with combustion, fuses in the flame and coats the lining, forming scale ring.

Effect of Cooling Upon Slaking and Settling Rate

The previous statement that slaking hot lime aids the settling rate of the carbonate may be a point of conjecture. Some authorities maintain that best causticizing and settling rates can be obtained using hydrated lime. Also, that if using cold quicklime delays causticizing and settling, so will there be the same objection to the slaking of lime at a temperature as discharged from the kiln. Recently, it has been considered that if lime could be slaked at a lime temperature of about 600 Fahr., best causticizing reaction and settling rate could be obtained. Perhaps, then, more consideration will be given to the cooling of lime to about 600 Fahr. and slaking the lime directly as discharged from the cooler.

Two types of coolers are available which could be applied to cool lime to this temperature. In normal application, they cool kiln products to less than 200 Fahr. above atmospheric.

One type is the indirect rotary tube cooler in which cooling air is forced around conveying tubes confined in a circular shell. The clean, heated air is introduced to the kiln as preheated combustion air. This type is applied successfully cooling aluminum oxide, a fine material, as well as rotary kiln pebble lime. Air from this type cooler would be introduced to the kiln at a temperature of about 600 Fahr.

A more efficient cooler which would introduce air to the kiln at about 1000 Fahr. is the grate type. In this cooler, the air is blown directly through the material on the grate. The grate conveys the material through the cooler. This type of cooler has been almost universally adopted by the cement industry and is also applied successfully to the cooling of lime from sludge kilns and pebble lime kilns. However, in cooling lime directly in this cooler considerable dusting can occur, and it would be essential to pass the heated air through a dust collector before introducing it to the kiln.

(*) This article has been published in two parts. Part I appeared in the October (1947) issue of this magazine.

FUELS

Oil, gas, petroleum pitch, and coal are all used as fuels for firing lime sludge kilns.

Coal

Coal, generally, would be the least expensive fuel but pulverized coal is not now fired directly into lime sludge kilns as is customary in cement and lime-from-stone kilns. It is considered that the ash present in coal would be stopped largely by the chain system and picked up by the sludge. The finely divided ash would not be removed to any appreciable extent in the slaker or slaker classifying equipment. This ash would be carried by the liquor throughout the system, and, due to the silica in the fly ash, probably would have a detrimental effect on liquor recovery equipment.

Coal for fuel in lime sludge kilns is utilized through a gas producer, burning the producer gas, with most of the ash retained in the producer. A gas producer itself is about 85 to 90 per cent efficient relative to utilization of the heat in the coal and the use of a gas producer may somewhat complicate over-all operation. Probably for these reasons, there are only a few lime sludge kilns fired with producer gas and these near the coal fields where delivered cost of coal is low.

Pitch

Petroleum pitch is an efficient fuel and is successfully utilized in one installation near the source of the supply. Petroleum pitch is pulverized and fired much the same as coal for cement kilns. One objection to petroleum pitch is its tendency to become sticky when warm, and care must be taken to minimize this.

Gas

The usual type of fuel is either Bunker C fuel oil or gas with oil predominating. Gas being used where the installation is close to the natural gas fields, and low cost gas is available in the quantity required for operation.

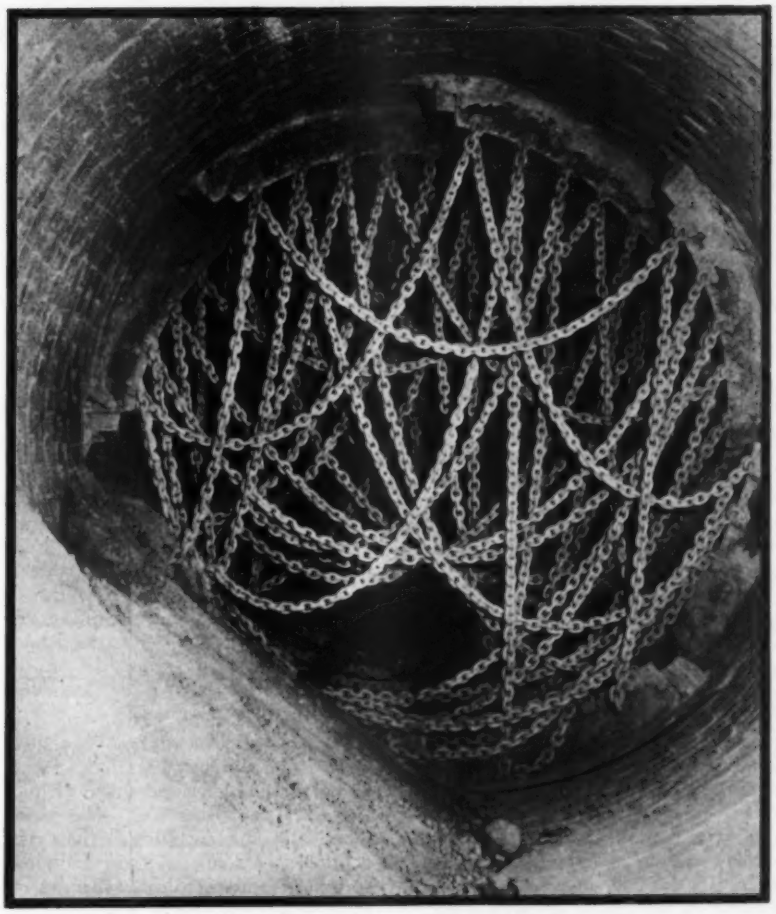
Oil

Bunker C fuel oil must be heated to about 200 Fahr. and properly atomized for efficient combustion within the kiln. Steam is usually employed for heating, but electricity can be used.

Oil can be atomized by steam, low pressure air, high pressure air, or by mechanical means.

In burning Bunker C fuel oil, steam or electricity is required for heating the oil to pumping and handling conditions. For a production of 100 tons of lime per day this amounts to approximately 150 pounds of steam per hour.

For atomization there will be required, per gallon of oil, from 2 to 5 pounds of steam at a pressure of 60 pounds or more in addition to that steam required for heating the oil.



Installed view of chain system showing chain, spirals and hangers

COSTS OF OIL ATOMIZATION

Assuming a steam cost of 25 cents per 1000 pounds and an electrical power cost of 1 cent per kilowatt hour, the comparison in the cost of oil atomization by various means, based on cost of operation per 100 gallons of fuel oil burned per hour would be:

	Cents per Hour
Mechanical atomization	2.4
Low pressure air	7.5
Steam atomization	10.0
High pressure air	30.0

Mechanical atomizing burners usually develop a short bushy flame of low velocity, the angle of which can be altered to some extent by changing the atomizer nozzle. However, combustion space required is usually wider than with other types of burners. This type of atomization, used generally for dryer combustion chambers of boilers is not extensively employed in firing a kiln.

Burners which atomize oil at high pressure with low pressure air are successful in kiln applications; however, air atomizing burners generally produce shorter flames than steam atomizing burners for equal capacity. The reason is the air, which is necessary for combustion, comes in immediate contact with the oil mist allowing ignition to take place quickly, and causes rapid combustion in a small space and shortens the flame.

With steam atomization, all air for combustion must be mixed with the oil after it is atomized by the steam. Consequently, there is a delay in the mixing of the air with the oil which, with the dampening effect of the steam results in slower combustion and a longer flame. For this reason steam atomization is suited for lime sludge rotary kiln application. The flame can be controiled and extended over a considerable length which results in a longer burning zone. Therefore, a less intense flame is obtained than with a mechanical or air atomizing burner.

For this reason, and with steam readily available, most pulp mill lime sludge kilns are fired with oil, utilizing steam atomization. Another reason for using steam atomization, is the flame can be confined to a long narrow cone and does not impinge on the brick lining. With most mechanical or air atomizing burners difficulty may be encountered in preventing flame impingement on the lining. Flame impingement on the kiln lining is to be avoided, for impingement results in a reduced brick life.

An ignition tile should be incorporated in the kiln firing hood to insure continuous ignition of the oil and to prevent puffing or pulsating of the burner flame. This ignition tile surrounds the burner port and is a highly refractory material which maintains itself at high temperatures, providing instantaneous and uniform ignition of the fuel.

With steam atomization all combustion air must be furnished from the air envelope around the flame. This air is usually induced into the kiln by means of the draft established by the exhaust fan or stack. However, it has been found that better control of the combustion within the kiln can be obtained if this air is furnished by means of a forced air fan. Better draft and more uniform burning conditions can be maintained with less pulsating demand on exhaust system. The air is introduced through a duct around the burner port to provide an air envelope around the flame, or it is introduced above the flame to depress the flame toward the charge to more effectively utilize the high heat of the flame.

To insure complete oxidization of the fuel to carbon dioxide and water, combustion is maintained with from 5 to 10 per cent excess air. Too much air, as well as too little air, wastes fuel. The forced air fan or its duct to the firing hood is provided with a damper which is set for the particular burning conditions to give the proper amount of air. Periodic Orsat analyses should be made to check the combustion and the damper adjusted accordingly.

DUST COLLECTOR AND EXHAUST FAN

The chain system in a lime sludge kiln is an excellent dust arrester. However, a small percentage of dust will be carried out with the exhaust gases and therefore a dust collecting system is desirable. If the collected dust is readded to the system the make up lime requirements will be reduced sufficiently to warrant such collection of dust and its subsequent reintroduction into the system.

Many of the older kilns, not equipped with chain systems, operated with a short stack and natural draft to pull the gases from the kiln. The usual short stack did not furnish the draft required to accommodate the draft loss across an efficient dust collector or spray chamber. As a result, no attempt was made to collect the dust, except ineffectively by washing the stack or by the use of small spray chambers. This attempt to collect the dust was limited because, with sufficient sprays, the temperature of the gases was reduced below that necessary to maintain sufficient draft at the stack base.

With a chain system equipped kiln, the use of an induced draft is almost mandatory. The chain system increases the resistance to gas flow—the draft loss increases—and under varying conditions of operation, the chain system will vary the draft conditions more than an open kiln. The induced draft fan with automatically operated outlet damper is ideally adapted to accommodate variations in operating conditions. It maintains a constant draft at the firing hood which is necessary for the proper combustion of the fuel.

A fan with a radial-bladed wheel usually serves best due to a lesser tendency to dust loading of the blades. Even though the blades may be unevenly loaded there is less tendency to set up an out of balance condition or vibration than in other types. A radial-bladed fan is less efficient in operation than a curved bladed fan and requires somewhat more horsepower; however, for draft purposes and handling dusty gases a radial-bladed fan is preferred.

For greater efficiency and lower power consumption, the fan could be operated by an adjustable speed motor or through a fluid coupling. For most applications a constant speed motor connected by multiple V-belt drive to a fan and an automatically operated damper would prove a simpler installation.

The motor can be a normal torque cage motor with ball or sleeve bearings. The multiple V-belt drive is favored rather than a direct connection to permit a ready change in speed if ever found desirable.

Table 3

Volume of Kiln Exhaust Gases in cfm per ton of lime per day
Based on: Combustion of Bunker C oil with
10% excess air for combustion
40% H_2O in feed
50% CO_2 in carbonate

Exhaust Gas	9,000,000 Btu/ton of lime. Exhaust gas temp. 400 Fahr.		10,000,000 Btu/ton of lime. Exhaust gas temp. 500 Fahr.		15,000,000 Btu/ton of lime. Exhaust gas temp. 1200 Fahr.	
	Volume (cfm)	Per-cent dry basis	Volume (cfm)	Per-cent dry basis	Volume (cfm)	Per-cent dry basis
H_2O	77.6		88.0		163.0	
CO_2	34.4	27.4	40.0	26.2	85.0	22.4
N_2	89.0	71	111.0	72.2	287.0	75.7
O_2	2.0	1.6	2.5	1.6	7.3	1.9
	203.0	100.0	241.5	100.0	542.3	100.0
Add 10% infiltration through feed end air seal and ductwork	20.0		24.1		54.2	
	223.0		265.6		596.5	
Add minimum of 20% per factor of safety in selecting fan	45.0		53.4			
Total	268.0		319.0		(Fan not used)	

Exit Gas Volume

To provide for abnormal conditions or emergency forced firing conditions, the exhaust fan should be selected for a gas volume at least 20 per cent in excess of that to be handled at normal maximum kiln capacity.

The total gas volume from the kiln would include products of combustion, carbon dioxide dissociated from the carbonate, water vapor from the sludge and approximately 10 per cent infiltration through kiln feed end air seal and ductwork. This amounts to 320,000 cu. ft. of exhaust gases at 400 Fahr. per ton of lime, based on the material and heat balances shown in Part I—with 40 per cent water in the sludge and 9,000,000 Btu per ton of lime with 10 per cent excess air

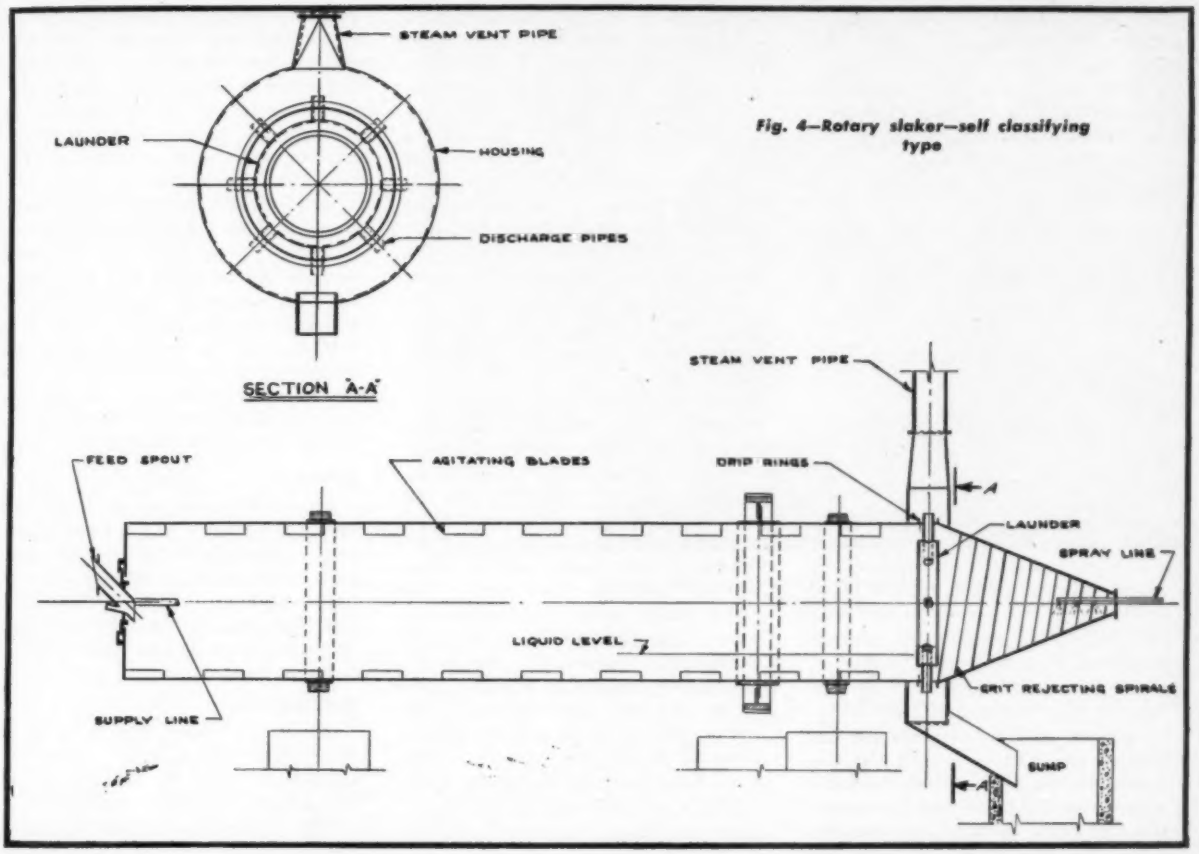


Fig. 4—Rotary slaker—self classifying type

for combustion. This, at 400 Fahr. is equivalent to 223 cfm per ton of lime per day, or at 100 tons of lime per day it would be equivalent to 22,-300 cfm. Add to this at least 20 per cent to obtain approximately 27,000 cfm, the minimum capacity of the exhaust fan.

See Table 3 for volume and per cent exhaust gases for various fuel consumptions.

There will be a maximum draft loss through the kiln of about ½ in. water column, and an additional loss of 1 to 2 in. will occur across a dust collector if it is used; therefore, the fan should be selected to have this capacity operating at a static pressure of 3 to 4 in. water column.

The fan, preferably, should be installed following a dry type collector or ahead of a wet collector. Abrasion of fan blades and dust loading is not severe on lime sludge kiln service; however, these would be minimized if the collector is installed on the clean air side of a dry collector. Gases leaving a wet type collector will be at a temperature of approximately 150 Fahr.; therefore, if possible, the fan should be installed ahead of a wet collector to minimize possible corrosion or erosion from condensing water vapor.

The form in which the collected dust can be handled most conveniently in each particular mill must be decided before selecting the dust collecting equipment. Dust can be collected dry in a simple cyclone or more efficiently in a commercially manufactured collector, pugged with water and flushed to waste, or readded to the system to reduce lime requirements. Collected dry dust must be pugged with water to permit ready transportation and reintroduction into the system and difficulty may be encountered in pugging this flocculently fine dust with water.

If the dust is to be readded to the system it can be done more easily from a wet type collector, collecting the dust in a form immediately convenient for further use. It is easier to wet the finely divided dust particles in the gas stream, than by pugging a mass of collected dry dust. For all practical purposes, a wet type of collector will insure 100 per cent recovery of the dust. More wet type collectors than dry type are applied to handle lime sludge kiln gases.

A number of commercial wet type collectors are available; however, a simple spray chamber type, and one which could be fabricated on the site is shown in Figure 2 (see Part I). The collector is constructed of unlined steel plate. The hot dust laden gases enter tangentially at the top and are sprayed by a multijet spray system mounted in the top of the collector. This forms a perfect curtain of spray through which the gases must pass to give a thorough wetting of dust particles. This wetting of dust, combined with the cyclonic action and change in direction of flow of gases leaving the chamber, drops the dust out of the gas stream. Gases are further washed in the stack. The spray chamber should be designed to give a gas velocity approximately one-third of the velocity of the gas in the feed end of the kiln.

The lower third of the spray chamber is the water-sludge reservoir. The water-sludge is recirculated through the spray system until it becomes the proper consistency at which time it is readded to the causticizing system. Make up water is added through means of float controller. All water from filters and rotary kiln mechanism cooling water (which amounts to approximately 10 gpm per mechanism) could be added continuously as process water through the spray chamber.

For a 100 ton of lime per day kiln, this type spray chamber should be approximately 18 ft. diameter by 20 ft.

high having a total of twenty spray nozzles recirculating 250 gpm. The stack, approximately 4 ft. diameter, need be only as high as necessary to clear surrounding buildings and usually can be supported directly on top of the spray chamber.

Kiln Feeder

For best operating procedure a continuous filter, usually drum type, should be and is installed close to the feed end of the kiln. The filter cake at about 40 per cent moisture drops into a screw conveyor which directly feeds the rotary kiln. The feed screw is water jacketed for that portion extending through the feed end connection and into the kiln. For a 100 ton of lime per day kiln, this screw would be approximately 16 in. in diameter.

Uniform production of lime from a lime sludge kiln and uniform operating condition and fuel consumption can be obtained only if the kiln is fed at a constant and a uniform rate with lime sludge feed containing a constant moisture. It is necessary to insure at all times a constant rate of feed to the kiln per revolution of the kiln.

In many of the mills difficulty has been encountered in feeding the kiln a uniform rate of lime sludge and this is due primarily to the inability to feed the filter at a uniform and constant rate of sludge. Control of sludge rate to the filter has been attempted through various means, with different mills arriving at a particular means considered most suitable. Some of these have been by a controlled pump, and others by means of a weir and weir box, or cake thickness gauge.

While most mills can obtain a fairly constant flow of slurry to the filter tank, constant attention must be given to these control methods to insure uniform flow and uniform feed to the kiln. It may be that this control can be accomplished better through a feeder which is used universally in the cement industry. This feeder handles fluid cement slurry containing approximately 40 per cent moisture feeding directly to wet process rotary kilns or to filters preceding the kilns.

This feeder is the ferris wheel slurry feeder. It is essentially a constant volume feeder operated in synchronization with the kiln motor and delivers a constant volume of slurry or sludge per kiln revolution. The ferris wheel slurry feeder consists of a horizontally rotating spider to which are attached buckets. The buckets, due to rotation of the spider, dip into a tank of sludge and lift out a definite volume in each bucket which is discharged into the filter tank. The slurry feeder spider and buckets operate in a constant level tank to which the slurry is pumped at a rate in excess of that required by the kiln. The excess overflows and returns to the storage tank. With a filter able to filter all sludge delivered to it, the ferris wheel slurry feeder automatically assures a constant feed to the kiln.

Make-up Lime

If no fresh lime is required for bleach plant or water plant, then lime lost in the process could be made up by burning oyster shell or limestone fed to the kiln with the sludge. The cost of reburning sludge per ton of lime is approximately one-half that of the delivered price of fresh lime. There would be little point in burning oyster shell or limestone with the sludge, unless the shell or stone could be purchased and handled to the kiln for a total cost per ton of less than 25 per cent the cost of fresh lime per ton (two ton shell or stone roughly equivalent to one ton of lime).

If this proves economically feasible, it can be done conveniently as shown in Figure 2 (see Part I). The shell or stone can be stored in a large storage bin, supported on ground level withdrawing the shell or stone at a uniform rate. A constant weight belt feeder may be used to discharge to an elevator, which elevates the shell or stone to the kiln screw feeder to introduce it with the sludge.

Table 4—Typical Operating Data

Pulp Capacity per day	450	ton
Reburned lime required per ton of pulp	445	pounds
Lime reburned per day	100	ton
Fuel (Bunker C oil) per day	6100	gallons
Btu per ton of lime $= \frac{6100 \times 148000}{100} = 9{,}000{,}000$		
Kiln Operation		
Output per hour	4.17	ton
Fuel flow per hour	255	gallons
Burning zone temperature	2000	Deg. Fahr.
Exit gas temperature	400	Deg. Fahr.
Draft		
Feed end	0.3	inches
Hood	0.01	inches
Exhaust fan damper	65%	open
Kiln Speed	0.9	rpm
Moisture in feed	40%	
Na_2O in feed (dry basis)	0.75%	
CaO in kiln product	90%	
Exit gas analysis		
CO_2	27.4	
CO	0	
O_2	1.6	
N_2	71.0	
	100.0	

Slakers

Lime is slaked in rotary or agitated tank type slakers with separate external classifiers to remove the grits and unslakeable material. Rotary slakers equipped with an integral classifier also may be used to efficiently combine slaking and classifying operations in one unit.

Refractories

Refractory lining life is good in rotary lime sludge kilns. However, refractories must be selected following general practice for sludge kilns.

The chain system is lined to a thickness of 4½ or 6 in. with hard burned firebrick, castable refractory or concrete.

The intermediate zone of the kiln is lined to a thickness of 6 in. with good quality firebrick or 40 to 50 per cent alumina brick, called hot zone liners. The lining life of these sections should better ten years. The burning or calcining zone, usually about 70 ft. long at the discharge end of the kiln is lined to a thickness of 6 in. or 9 in. with 70 per cent alumina brick. Brick in this section is subject to the most severe conditions and the life will range from six months to about four years before replacement is necessary.

Sometimes the intermediate zone is insulated with diatomaceous brick or blocks to a thickness of 3 in. between the shell and the over-lying brick to reduce radiation losses.

Operation

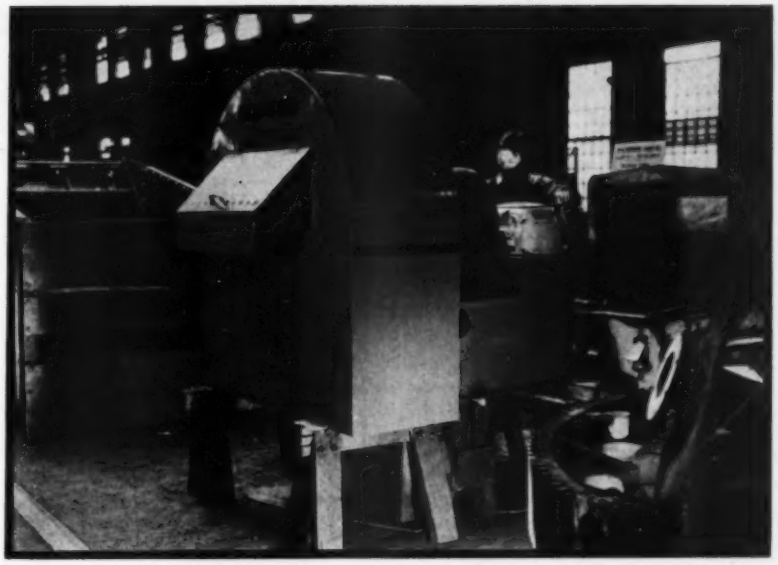
A tabulation of typical operating data is shown in Table 4. The primary purpose of the rotary kiln is to reburn an otherwise waste product, lime sludge, continuously producing a high quality lime at a uniform rate on an economical basis with a minimum of equipment maintenance. This is balanced operation.

To obtain these results close attention must be given to operating procedure.

The kiln must be fed at a constant rate with a lime sludge of constant analysis. The kiln may be divided into three zones; the drying zone, which is the feed end of the kiln with the chain system, the intermediate or preheating zone, and the calcining or burning zone. Any change or variation in moisture content will upset operation or balance in all zones and can be counteracted only by constantly changing kiln speeds or adjusting fuel flow. Either of these in turn would further unbalance each zone leading to a continual hunting or adjustment of kiln operation. Such operation would give nonuniform exit and burning temperatures which are not conducive to production of uniform lime at best fuel consumption.

Lime in most kilns is discharged in the form of dust free pellets and, at least, five items contribute to this desirable product form. The water, impurities, and soda in the sludge feed, the disintegrating action of the chains on the filter cake and the rolling action of the sludge on the kiln wall. The lime sludge as discharged from the chain system should have a moisture content of from 5-10 per cent for best operation of the chain system. The material will be at an apparent temperature of about 400 Fahr. when discharged from the chain system. The lime sludge will have its pelletized form, averaging ½ in. diameter, at this point. This pelletized form and size will be retained through the preheating and calcining zones unless caused to further agglomerate by presence of the impurities and soda content of the sludge. Impurities can be controlled by green liquor clarification and slaked lime classification. For best operation in most kilns it is beneficial to hold the soda content in the sludge to 1 per cent or less, reported as Na_2O on the dry basis. This can be accomplished by sufficient counterflow mud washing, spray washing on the filters (hot waterwash will give a lower soda content than cold water), or a double filtering operation repulping between stages.

In the formation of oversize pellets or large balls, more heat is required for average calcination. The outside of the large balls may be overburned to give an inactive lime with the center core underburned, all resulting in a low availability of CaO in the kiln product. Available CaO should range 85-90 per cent in the average reburned lime. The balance, or 10-15 per cent, of the lime contains sodium calcium silicates, inactive calcium oxide, calcium carbonate, iron, aluminum and silica compounds. A considerable percentage of all these impurities is removed in the slaker classifier.



Assembled view of ferris wheel slurry feeder

DAM RINGS

In addition, the soda content of the sludge will reduce the fusion temperature of the lime. With increasing amounts of soda in the sludge, there may be an accompanying ring formation (agglomeration of charge to lining) in all three zones of the kiln. High soda content will have a deleterious effect on the kiln lining, particularly in the calcining zone, shortening brick life.

Sometimes dam rings of material may build up in the chain system even though the soda content is held to a possible minimum below 1 per cent. A change in moisture content of the sludge will usually correct this to cause a transition of drying in the chain system and eliminates this ring formation. To correct persistent ring formation in any of the three zones, it may be necessary to further change the feed to better control the impurities or to add a scouring or neutralizing agent, such as shell or stone, in amounts in excess of that actually required for makeup purposes.

All other factors equal, small diameter kilns seem more prone to ring formation, particularly in the burning zone, than do larger diameter kilns. The reason for this can be the greater arch effect inside the lining of small kilns will better retain a ring formation in place against the lining. The smaller arch effect of the large diameter will permit agglomerating material to fall away from the lining during kiln rotation thus minimizing ring formation.

CONTROLS

In addition to controlled feed, controlled combustion of the fuel is of utmost importance in uniform kiln operation. For controlled combustion for any given feed rate, temperatures must be held uniform and the draft at the firing hood must be held constant. This can be accomplished through the use of a few essential instruments and controls, the most important of which is a draft controller. The draft controller will operate through the draft obtained at the firing hood to electrically or pneumatically regulate the exhaust fan outlet damper and maintain this draft at the desired value for best operation. The usual draft at the firing hood will range from 0. to .02 inches water column.

To properly record, interpret and control the kiln operation, there should be available to the kiln operator a record of the feed end gas temperature, the burning zone temperature, the rate of fuel flow, and the drafts at the feed end of the kiln and at the firing hood. To obtain the feed end temperature a bimetallic thermocouple is installed in the feed end chamber or feed end of the kiln with a potentiometric or electronic instrument indicating and recording the temperature obtained. Additional thermocouples can be installed along the kiln to obtain the gas temperature at any desired point. The pickup of the temperature at any point along the kiln other than the feed end, can be obtained by thermocouples permanently installed through the kiln shell. Trolley wires and contact brush arrangements connect these thermocouples to temperature recorders. The instrument for obtaining the burning zone temperature consists essentially of a thermopile upon which heat is fo-

cused through a lens contained in a sighting tube. This instrument is sighted on the charge or lining in the burning zone, recording this temperature by a potentiometric or electronic instrument.

All instruments and operating controllers should be mounted on a central control board or cubicle located on the burning floor, and convenient to the kiln operator. The control panel should also include all necessary gauges, ammeters, voltmeters and motor starter push button stations.

Costs

A typical cost analysis is shown in Table 5.

There will be required one man per shift to operate the kiln. In addition, there will be required approximately eight hours time throughout a day of 24 hours by other workers. This time would be devoted to checking mechanical operation, including lubrication, and assistance around the kiln either at the discharge end or at the filters. This amounts to 32 man-hours per 24-hour day, which, at $1.25 per hour, would be equivalent to $40 per day for labor, or on the basis of 100 tons of lime per day, equivalent to $.40 per ton of lime.

There would be a fuel cost of $3.66 per ton of lime based on 9,000,000 Btu per ton of lime and oil at $.06 per gallon.

Electrical power requirements will usually be about 25 kw hours per ton of lime which at $.01 per kw-hr. is equivalent to $.25 per ton of lime.

Therefore, the total charges for labor, fuel and power would be equivalent to $4.31 per ton of lime reburned.

Table 5—Typical Cost Analysis

Based on:
450 ton/pulp mill
100 ton/day reburned lime required
9,000,000 Btu/ton of lime
(61 gal. of Bunker C oil)
Oil fuel
330 day per year operation

Equipment
One kiln
Slaker
Feeders
Filter
Exhaust fan
Oil burning equipment
Hot lime conveyor
Dust recovery equipment
Controls

Item		*Cost per ton of lime*
Labor		
32 manhours per day at $1.25 per hour	$= \frac{32 \times 1.25}{100} =$	$ .40
Power		
Fuel		
25 kw-hr. per ton of lime at $0.01 per kw-hr.	$= 25 \times .01 =$	.25
61 gal. of oil at $0.06 per gal.	$= 61 \times .06 =$	3.66
Repairs, supplies, repair labor estimated to be 15% of equipment cost annually	=	.11
Interest, taxes, depreciation and obsolescence estimated to be 20% of installed cost annually	=	.30
Total cost per ton of lime		$4.72
Total cost per ton of pulp		$1.07

To obtain the actual cost of the lime per ton, to this figure of $4.31 must be added the cost of repairs, supplies and repair labor as well as interest, taxes depreciation and obsolescence of the equipment. At present prices and costs, for a 100 ton per day lime production this would give an over-all cost of approximately $4.72 per ton of lime reburned.

Photomicrographs . . .

(Continued from page 1128)

and printing techniques. Data on exposures made for the illustrations shown in the article, however, may prove helpful and they are, therefore, listed as follows:

Distance from center of 2 Watt Conc. Arc to Sample	3.5 in.
Effective aperture of lens	f/18
Daylight Weston number of the orthochromatic film	50
Exposure	3 min.
Angle of illumination	8 deg.

Conclusion

Important commercial gains can be obtained through use of good surface photomicrographs of papers and boards. Those who may wish to utilize these advantages might naturally consider the commercial photographer as a possible source for such photomicrographs. Unfortunately, few commercial photographers possess the knowledge of papermaking needed for satisfactory results in this field. This is not surprising, for the amount of this type of work does not loom large as a source of revenue for the regular studio.

Any well-manned and equipped paper mill laboratory can gain the benefits from such a program.

For those who desire these advantages but question the practicability of setting up their own private laboratory arrangements, certain general service paper-testing laboratories may be able to render valuable assistance.

Literature Cited

1) Buckingham, W. D., and Deibert, C. R. Characteristics and Applications of Concentrated-Arc Lamps. *Journal of the Society of Motion Picture Engineers*, Vol. 47, No. 5, Nov., 1946, pp. 376-399.

White-Collar Morale . . .

(Continued from page 1129)

One can have efficiency of a sort without good human relations—but not the kind of office where efficient people like to work.

Proper Working Conditions Help

There is no reason why the same amount of intelligent planning should not be put into the location of desks, lights, file cabinets, large office machines and other items as into the handling of factory floor space and the location of assembly lines and heavy machinery. It is just as important to save steps and reduce effort on the part of office employees, by keeping departments as unified as possible; by seeing that related departments are kept adjacent, and by giving each employee sufficient space for auxiliary equipment, such as dictating machines, individual files and extra chairs.

Other physical details which affect morale include: proper illumination and ventilation; good posture chairs to relieve and prevent fatigue; desks the right height for comfortable use; proper and restful use of color; elimination of unnecessary noise; last, but not least, good office housekeeping and clean, sanitary washrooms.

The organization of work is another important consideration. One could write volumes on this subject; in fact, many such volumes already have been written. Suffice it to say that the fundamentals of good organization are nowhere more important than in the office itself. The hours spent on charting sound working relationships, both staff and line, always pay off in good results.

Visual Controls in Paper Trade

FULLER ROSS

▶▶▶ THE MANY FACTORS which enter into the rapid, efficient, and quality manufacture of paper and paper products must be kept under the control of management at all times. The time-consuming systems in plants where book or file records have been relied upon have been found wasteful, and the present trend is toward visual methods of control.

The old method of analyzing figures not only wastes the time of executives and office workers, but it offers no help in making a forecast possible when a "bottleneck" requires handling.

The visual system gives, at a glance, such factors as materials reserves, machine performance, and progress day by day or hour by hour of orders or lots, delivery dates and progress thereto, cost factors, and so on. The flexibility of the visual (board) method is what appears most strongly to mill people since any factor pertinent to production and efficiency can be corrected day by day based upon actual conditions and not on guess work or complicated book or file records.

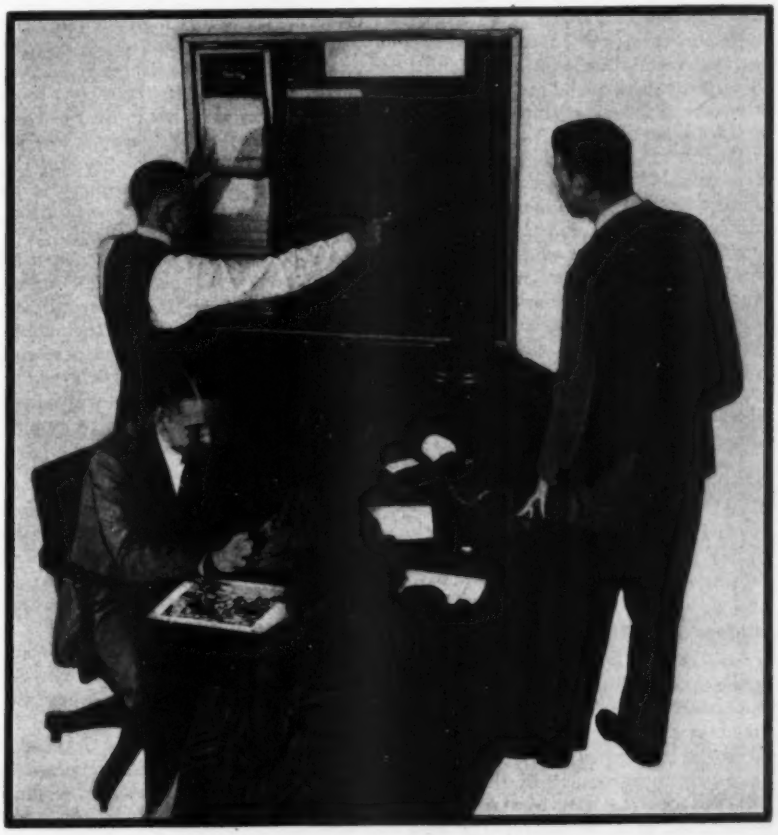
The visual control system referred to is extremely simple, and can be operated by an intelligent routine office worker. The flexibility of the method will be easily understood from the following description:

A visible index, located at the left side of the board, is used to hold the permanent card records of the items or elements under control. There are 100 card pockets on each panel. A legend, located at the top of the board, is used to show the meaning of the pegs and cards.

A peg-hole section is placed on the main body of the board for the purpose of visibility, analyzing information on the cards by means of the pegs and cards. A heading strip is attached across the top of the peg-hole section —to reveal quantity and/or time represented by peg holes from left to right. There is one tape peg for each item in the visible record panel, and each is numbered to correspond with card pocket (at its left). Each peg is attached to a cord which pulls outward from the board so that it may be extended from left to right on the board as needed.

The signal pegs are to be located, according to procedure, in the various peg holes, their meaning being noted on the legend at the top of the board. The "today line" is attached vertically to the board and is moved periodically from left to right in accordance with the time element in the procedure.

Thus, in making it possible to exert control in this kind of an operation, a visual method such as this offers certain very definite advantages. It provides, at a glance, a knowledge of all pertinent facts and figures, eliminates from the executives' attention situations which are in a normal condition, spotlighting the bad points and thereby reducing, immeasurably, the amount of time necessary to make an analyzed report.



It flashes the facts to all interested parties at one time, is flexible and can be adapted quickly to any problem. It eliminates (according to the users) or greatly reduces the amount of time necessary for the accumulation of usable facts from a routine, paper record.

In fact, it is well known that in any kind of business operation, the greatest obstacles to efficiency are bottlenecks that appear from nowhere, and always develop at the wrong time. However, it is also true that bottlenecks do not just happen—they are the slow, constant, growth of weak production or operation control which reflects the need for improvement. Students of postwar business controls generally agree that, in view of these facts, the remedy at hand is to have a stronger link of production or operation functions with the central control that gives an up-to-date minute picture of your business; a graphic presentation of past, present, and future operations, singly, combined, and in proper sequence one to the other.

Perhaps before the war, while these needfuls and their objectives were appreciated and even sought in industry, through various methods, the postwar world is becoming constantly more visual-minded with the result that methods of operation in all kinds of enterprises today are converging to the point of the graphic.

Electrical Control of Tension in the Paper Industry

G. E. SHAAD
Paper and Textile Division
General Electric Company

▶▶▶ THERE ARE MANY TIMES during the manufacture and processing of paper that it is desirable to maintain a constant sheet tension in order to provide a more uniform product with a minimum of waste. In the past, much of this has been left to the discretion of the operating crew, depending upon manual adjustments to maintain the desired conditions. However, the present trend is more and more to automatic control. This has resulted partly from a need to eliminate the human variable, but also it has come from a need to release the operator from these continual manual adjustments, so that he may pay closer attention to the material in process and produce a better product.

Typical of these applications where it is desirable to release the operator from continual adjustments are the winding and unwinding stands on a supercalender, the unwind stands of a winder, the holding of a loop in a processing line, and similar applications where automatic maintenance of tension or lack of tension can release the operator to other work. All of these applications can be controlled manually, but they do require attention and time that can be used better elsewhere.

There are many types of tension control systems, that have been designed to meet widely varied requirements as to power, speed, and cost. To clarify this picture, it is perhaps best to describe some of the more widely used systems and their operation.

Dancer Roll Rheostat Control

The dancer roll rheostat may be used either to maintain a lightly loaded loop as shown in Figure 1 (A) or to maintain tension on a windup stand, as shown in Figure 1 (B). In either case, a down movement of the dancer roll will operate the rheostat in the motor field so as to weaken the field of the motor driving the following sections. This results in an increased motor speed, thereby keeping the dancer roll from further downward travel. The only basic difference between the two systems as shown is the range of control required in the rheostat. In the case of maintaining the loop, only a small change in motor field current is required to maintain the position of the dancer roll, whereas in the case of the windup motor a very wide change in motor field current is required to compensate for the changing diameter of the roll

Such a system is primarily suited to lower power, slower speed applications, where threading the paper through the loop is not objectionable, and where additional rolls are not a detriment from a cost or operation standpoint. It has the advantage of being electrically simple and inexpensive and it also has the advantage of being a tension measuring device with a high accuracy for tension, since it is determined entirely by the weight of the dancer roll.

Its main disadvantages are some maintenance, as a result of the constant operation of the rheostat mechanism, and a lack of flexibility, for the only way in which the tension can be changed is by increasing or decreasing the weight of the dancer roll. It is also at a disadvantage if it is necessary to thread with a narrow tail which may not have sufficient strength to support the dancer roll. In such a case it is necessary to raise the dancer roll manually until a full sheet is available to support the roll and then release the dancer roll to allow it to resume control.

Rider Roll Rheostat Control

Like the dancer roll rheostat, this is a mechanically operated rheostat system used on windup drives such as shown in Figure 2. The increasing diameter of the roll operates the rheostat to strengthen the field of the windup motor and thus keep its speed and power approximately correct. A variation of this system is to gear the rheostat to the windup shaft, and in this way vary the motor field as a function of the number of revolutions that have been made by the windup shaft.

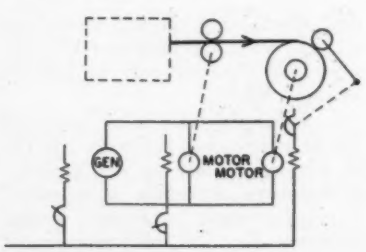


FIG. 2
USE OF RIDER ROLL RHEOSTAT TO COMPENSATE FOR REEL BUILD-UP

The only advantage of such a system is a low initial cost. Its disadvantages are many. Among these disadvantages are the necessity for accurately matching the rheostat characteristics to the motor characteristics, the touching of the finished surface by a roll, the mechanical inconvenience of such a roll, a lack of flexibility, mechanical maintenance, etc. As a result of these many disadvantages, the rider roll system is seldom found in present-day control.

Series Motor Control

The special characteristics of a series wound motor can be used in some cases to maintain approximately correct tension on windup drives. The required characteristic is constant horsepower, for at constant paper speed and constant tension, the product of force times speed is constant and, consequently, on a roll of increasing diameter the product of motor speed and motor torque must also remain constant. Since under conditions of constant paper speed the motor speed must decrease as the roll diameter increases, then the motor torque must increase accordingly to maintain speed times torque at a constant value.

Given a constant paper speed and a varying reel build-up (Figure 3), the drooping characteristic of the series motor will come fairly close to matching the required change in torque to give constant tension. As the roll diameter increases and the motor of necessity slows down, a slight increase in armature current is sufficient to increase the motor field the required amount.

This system is not suitable for wide ratios of roll buildup or where machine speeds may be changed during operation. It is only an approximation of constant tension and on a roll buildup of 4 to 1 the tension undoubtedly will vary by plus or minus 25 per cent. However, for some small jobs it is a simple, inexpensive drive that is sufficiently accurate for the material in process.

A-C Torque Motors

Where constant back tension is to be maintained by a pair of drag rolls, an arrangement using a-c torque motors provides constant pull with a minimum of equipment. Figure 4 shows a portion of a processing machine where the paper passes from a storage loop through a pair of dra(

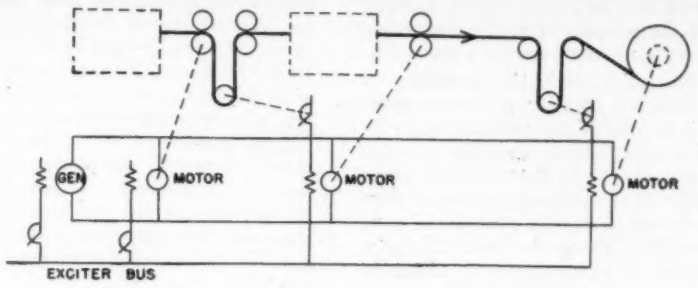


FIG. 1A FIG. 1B

USE OF DANCER ROLL RHEOSTAT FOR TENSION CONTROL

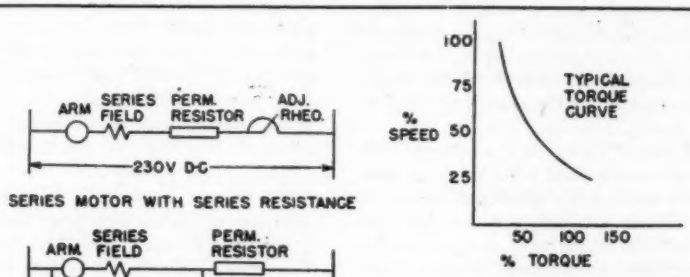


FIG. 3

SERIES MOTOR CHARACTERISTICS USED FOR WIND-UP DRIVES

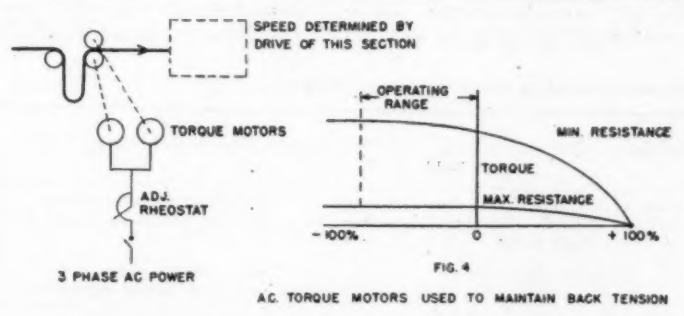


FIG. 4

A.C. TORQUE MOTORS USED TO MAINTAIN BACK TENSION

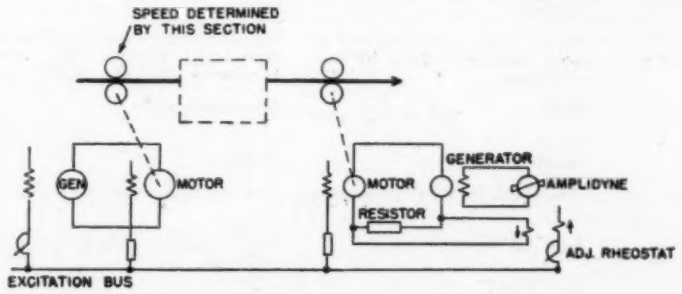


FIG. 5

CONSTANT CURRENT CONTROL OF PULL ROLLS USING AMPLIDYNE CONTROL OF GENERATOR FIELD

rolls to maintain tension on the paper as it enters the processing equipment. These torque motors are operated against rotation, and as shown in the speed torque curve, the torque remains nearly constant regardless of machine speed. A series rheostat determines the motor voltage and since the torque varies as the square of the motor voltage, a very wide range of control that is quite accurate is the result.

This is a good, reliable system when the power requirements are low; consequently, the power loss and the heating of the torque motors is within reason. It can be used, of course, only where roll diameter is constant and where a free loop is available ahead of the drag rolls. On occasion, it has been combined with the equivalent of a dancer roll rheostat, with the rheostat acting in series with the torque motor armatures in place of the field of a d-c motor. It has the additional advantage of being suitable for stalled torque operation.

D-C Motors with A-C Control

This type of control divides into two application groups, depending upon whether the driven roll will be of the constant diameter or of a variable diameter.

The first group represents the simplest application and often is used on drag rolls or pull rolls, as shown in Figure 5. Here in the case of the pull roll, the drive motor is supplied with power from a generator whose field is so controlled as to maintain constant armature current in the circuit. Since the field flux of the motor is constant, this results in a constant motor torque and a resultant constant pull on the sheet regardless of paper speed, if the friction load remains constant. In the case of drag rolls, the same explanation is true, except that the direction of current is reversed so as to take power from the roll instead of delivering power to the roll.

This system is used not only on pull roll and drag roll applications, but it also is used in any application where constant torque is required and continuous operation under stalled condition is not required. Such applications are found in top roll drives, press helper drives, etc. It has the advantage of simplicity and ease of adjustment; it uses standard motors and generators. In general, the motors will be ventilated separately in order to provide for continuous operation at slow speed. However, even with separate ventilation, continuous operation at stalled conditions is not desirable for it will result in localized commutator heating.

Usually an amplidyne is used to sup-

ply the field of the generator, for the wide range of operation that can be obtained and the low power requirements of the control field of the amplidyne make it possible to use only a small amount of dropping resistance in the armature circuit and still provide accurate control of armature current. In other cases, however, an electronic control panel for supplying the generator field may be used, or in other cases where only motoring operation is required, both the motor armature current and the motor field may be supplied from an electronic panel such as Thy-mo-trol. Figure 6 shows the three such systems and Table 1 lists some of their application notes.

The second group of applications, where the diameter of the driven roll is variable, is somewhat similar. Wind-up and unwind stands are typical of such applications and provide the largest number of tension controlled installations in the paper industry. Two variables are encountered in such drives: the paper speed, which is dependent upon the desired operating speed of the machine, and the roll diameter as the paper is wound. As described previously under series motor control, with a constant paper speed, a constant paper width and a constant pull in pounds per inch width, the required horsepower is constant. With paper speed a variable, then the required horsepower is directly proportional to paper speed.

At a given paper speed, the motor horsepower must remain constant throughout the motor speed range required by the change in roll diameter and the product of motor torque and motor speed must remain a constant.

The easiest method of providing approximately constant motor horsepower is to provide the motor with a constant voltage and maintain constant motor current by control of the motor field. In this manner, the input power to the motor is maintained constant, and, except for some change as a result in changing motor efficiency, the motor output remains constant. For a variable paper speed where the horsepower must be proportional to paper speed, by varying the motor voltage proportional to paper speed, we will vary the input power to the motor and likewise the output of the motor in proportion to the changing speed of the paper.

Figure 7 shows such a system with the motor supplied with a voltage proportional to paper speed and the motor current maintained constant by control of the motor field so as to provide horsepower proportional to paper speed as is required.

This does not provide exactly constant tension, for as the speed of the motor changes during the increase or decrease of the roll diameter, the friction and windage of the motor will change. Consequently, the output of the motor will vary somewhat even though the input power to the motor remains constant. Likewise, the changing weight of the roll will change the friction loss of the roll stand and, as a result, will vary the available power for establishing tension in the sheet. In the normal application, these changes are relatively small (perhaps plus or minus 10 per cent) and have little effect. However, it is a factor that must be considered. The greater the ratio of empty roll to full roll diameter and the smaller the size of the driving motor, the greater will be the variation that is encountered. Special recalibrating circuits can overcome this to some extent, but they are an additional expense and are somewhat difficult to adjust.

A similar system can be used to control the back tension of an unwind stand by using a braking generator pumping power into a voltage held proportional to paper speed. By controlling the field of the braking generator to maintain constant current, the back tension will be held essentially constant regardless of paper speed or change in roll diameter.

As is true with rolls of constant diameter, either amplidyne or electronic field control may be used for the motor, or an all-electronic system may be used in some cases. Figure 8 shows the three types, and Table 2 lists some of the notes on their application.

Limitations on Unwind and Windup Drives

Although the current controlled windup and unwind systems give excellent results when used within their limitations, there are many times when they are used without regard to the range of operation for which they were designed. In other cases, the best operation cannot be obtained be-

TABLE 1—Current Control by Variable Voltage Supply

	Amplidyne Control of Generator Field	Electronic Control of Generator Field	Thy-mo-trol Power Supply
Application	Controlled torque on rolls of fixed diameter regardless of roll speed	Controlled torque on rolls of fixed diameter regardless of roll speed	Controlled torque on rolls of fixed diameter regardless of roll speed
Maximum Power	No limitation	No limitation	Most common below 15 hp. but can be built in larger capacities
Minimum Power	Most common above 10 hp.	Most common above 10 hp.	Down to about ½ hp.
Accuracy	Good	Excellent	Excellent
Power Loss	About 10 volts drop required in series armature resistor for current signal	About 5 volts drop required in series armature resistor for current signal	No dropping resistor required. Current signal obtained from current transformer in tube anode circuit
Motoring or Generating	Either	Either	Motoring only
Reliabity	Excellent	Excellent	Excellent
Maintenance	Low—Brush replacement and commutator care	Low—Periodic tube replacement	Low—Periodic tube replacement
Power Supply	Any	Any AC	50/50 cycle standard—any other is special
Range of Current Adjustment	About 5/1	About 5/1	About 5/1
Cost $/hp.	$100-$700 depending upor hp. Lowest cost at high hps.	$100-$700 depending upon hp. Lowest cost at high hps.	$200-$500—Lowest cost in the 5-15 hp. range.

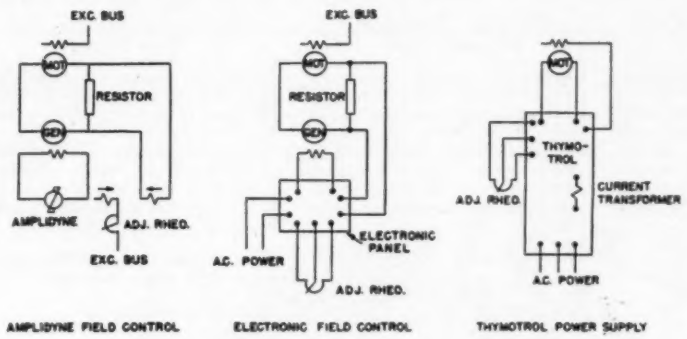


FIG. 6

THREE SYSTEMS OF CONSTANT CURRENT CONTROL WITH CONSTANT MOTOR FIELD

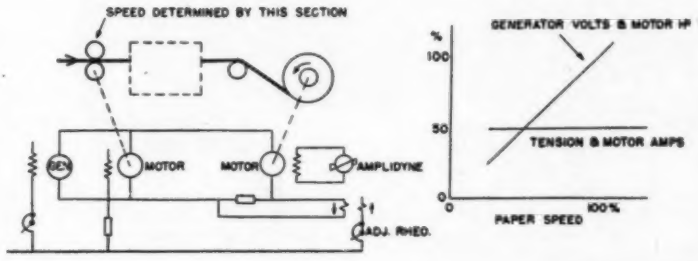


FIG. 7

CONSTANT CURRENT CONTROL OF WIND-UP REEL USING AMPLIDYNE CONTROL OF MOTOR FIELD.

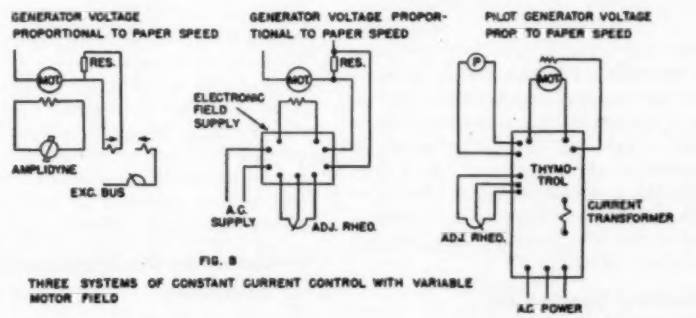


FIG. 8

THREE SYSTEMS OF CONSTANT CURRENT CONTROL WITH VARIABLE MOTOR FIELD

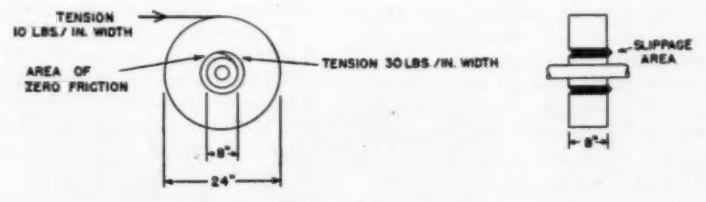


FIG. 9

SLIPPAGE ON NARROW ROLL AS A RESULT OF CONSTANT TENSION AND LOW COEFFICIENT OF FRICTION

cause of insistence upon high ratios of minimum to maximum roll diameters, or insistence upon extreme ranges in tension settings. While drives to meet these requirements can and have been built to operate satisfactorily, both the initial cost and the operating cost have been high as a result.

Perhaps the most prevalent contributor to high initial cost is extreme ratios of roll diameters, such as a 6-in diameter core for a 60-in. finished roll. While it is true that a small amount more of paper can be wound on a core of minimum diameter, actually in the great majority of cases little or nothing is gained and much can be lost by the adoption of extremely small core diameters.

If we consider the relative volume of paper that may be wound upon two different core diameters, the results are quite striking.

With a 6-in. diameter core and a 60-in. diameter finished roll, if we assume a heavy paper 0.010 in. thick, by using the following formula we can determine the total paper in the finished roll:

$$L = \frac{0.0654\ (D_2^2 - D_1^2)}{T}$$

where L = Total length of paper (feet)

T = Paper thickness (inches)

D_1 = Core Diameter, empty (inches)

D_2 = Roll Diameter, full (in.)

Substituting in this formula, we find a total paper length of 23,350 ft.

Now if we increase the core diameter to 15 in., how much increase is required in the full roll diameter to give the same total length? Substituting again in the formula, we find that the new full-roll diameter need only be 61½ in. Thus, although the core diameter has been increased to 2½ times its original diameter, a mere 2½ per cent increase in the finished roll diameter results in the same amount of paper.

Now consider the influence of this change upon a windup motor maintaining constant tension throughout the reel buildup. Assuming a speed of 500 fpm, a width of 100 in., and a tension of 4 lb. per inch width; we require 6 hp. throughout the speed range of 10 to 1 with the small diameter core but throughout, only a speed

TABLE 2—Current Control by Motor Field Control

	Amplidyne Control of Motor Field	Electronic Control of Generator Field	Thy-mo-trol Armature and Field Supply
Application	Controlled constant current input to motor driving roll of variable diameter so as to maintain a power input proportional to paper speed with variable motor field. Motor to receive power from a generator whose voltage is proportional to paper speed	Controlled constant current input to motor driving roll of variable diameter so as to maintain a power input proportional to paper speed with variable motor field. Motor receives power from a generator whose voltage is proportional to paper speed	Controlled constant current input to motor driving roll of variable diameter so as to maintain a power input proportional to paper speed. Armature voltage is maintained proportional to paper speed by comparing arm. vol. to pilot gen. vol. Current is maintained constant by control of motor field
Maximum Power .	No limitation	No limitation	Most common below 15hp. but can be built in larger capacities
Minimum Power	Most common above 5 hp.	Most common above 3 hp.	Down to about ½ hp.
Accuracy	Good	Excellent	Excellent
Power Loss	About 10 volts drop required in series armature resistor for current signal	About 5 volts drop required in series armature resistor for current signal	No dropping resistor required. Current signal obtained from current transformer in tube anode circuit
Motoring or Generating	Either	Either	Motoring only
Reliability	Excellent	Excellent	Excellent
Maintenance	Low—Brush replacement and commutator care	Low—Periodic tube replacement	Low—Periodic tube replacement
Power Supply	Any	Any AC	50/60 cycle standard—any other is special
Range of Current Adjustment	About 5/1 maximum	About 5/1 maximum	About 5/1 maximum
Range of Max. to Min. Roll Dia.	Depends upon horsepower rating but 6/1 maximum desirable even at low horsepower	Depends upon horsepower rating but 6/1 maximum desirable even at low horsepower	Depends upon horsepower rating but 4/1 maximum desirable even at low horsepower

range of 4.1/1 with the large diameter core.

The first would present a very difficult control problem, for it is too wide a speed range to obtain by motor field control. Consequently, it would be necessary to go to some answer such as the dancer roll control with both variable armature voltage and field voltage on the motor.

The second case, however, is readily built in not only small but large horsepower ratings, and a simpler much less costly system is the result. On a wide high speed machine a small increase in core diameter may easily result in the saving of several thousand dollars in initial cost and additional savings in future maintenance.

Another problem often encountered is the desire to obtain a very wide range of tension control, so that all possible grades, both present and future, may be handled on one machine. Such a desire is easily understandable. However, there are limits beyond which the electrical designer cannot go and still provide any semblance of accurate control. The maximum speed which will ever be used in operation and the maximum weight of paper ever to be wound will determine the motor horsepower and, naturally, the higher the horsepower rating the higher the initial cost. Even though the heaviest paper never will be operated at full speed, however, at reduced speeds only the motor armature voltage is reduced and the motor must still handle its full rated current. Likewise, mechanically, it must be designed to stand the maximum speed at which it will ever be operated. For this reason, it is to the user's advantage to look realistically at his production and specify only those weights of paper that must be handled by the equipment. As a general rule, a tension range of over 5 to 1 is difficult and expensive to obtain, and at the low tension values the accuracy is limited.

Constant Tension on Narrow Rolls

The problem of winding very narrow rolls of material is often considered as a constant tension application. Usually this is true. However, in the case of material having a low coefficient of friction, constant tension winding may result in slippage between layers and consequent telescoping of the roll. As shown in Figure 9, when the roll is wound upon a driven core, the torque at the core must increase directly as the roll builds up in order to maintain constant tension at the outside diameter. Ordinarily, this increased torque is absorbed by the material without slippage, but if friction is low, the layers may finally slip as the torque becomes too great and the roll will tend to telscope at the point of slippage.

In such an application, a constant torque drive may be more suitable, for, while the sheet tension will vary, there is no change in torque on the layers of paper after they are wound. Therefore, they have no reason for slipping. By keeping the ratio of maximum diameter to minimum diameter low, the actual tension still will be sufficient to give a firm tight roll.

Information for Specification of Equipment

While several types of systems have been described, each has its limitations and uses, and without knowing exactly the use to which a system will be put, it is impossible to say one or the other should be used. In general, the control manufacturer is in a much better position to recommend the proper control if it is recognized that different types and sizes of equipment can best be handled in different ways. Likewise, the more information that can be given to the manufacturer regarding operating conditions and requirements, the better position he is in to recommend and build a system that will give the user equipment best suited to his requirements.

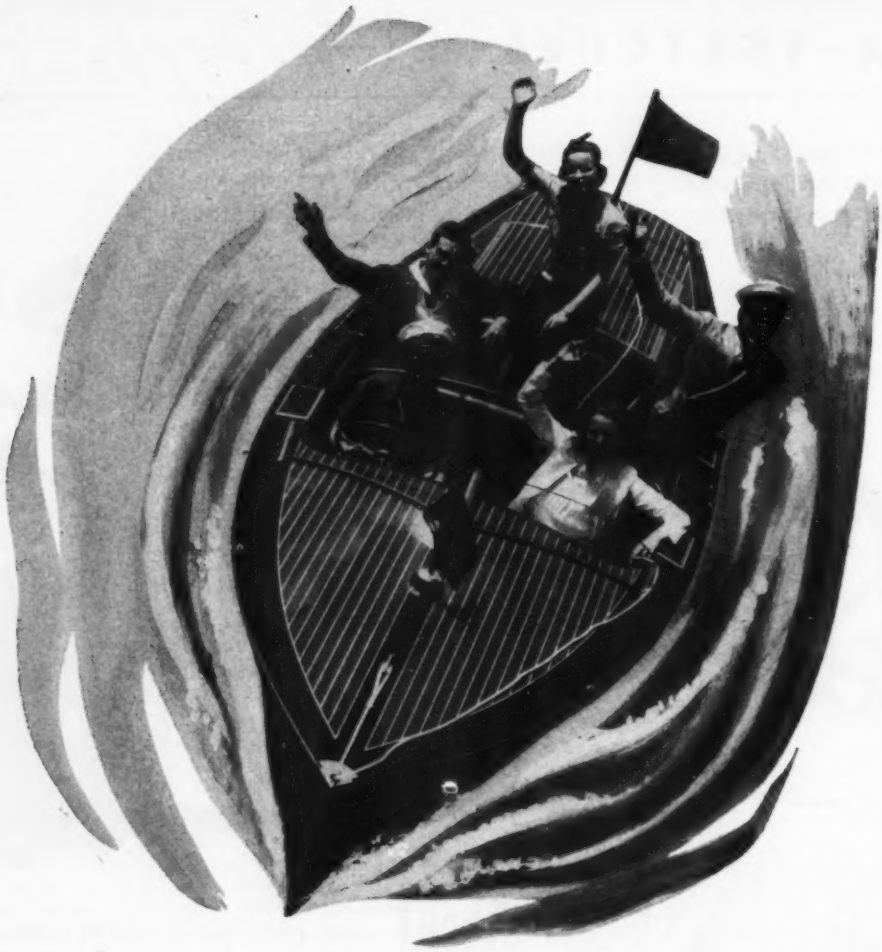
Paper SKETCHES . . . . . .

PAPERMAKING FELTS, MADE IN THE 1870's BY H. WATERBURY & CO., OF RENSSELAERVILLE, N.Y., WERE SENT OUT TO FARMERS' WIVES AND DAUGHTERS IN THE NEIGHBORHOOD FOR JOINING.

About 1800, BRITISH AND NEW ENGLAND SKIPPERS BROUGHT FROM CHINA TO THEIR HOME PORTS A SHEET-LIKE MATERIAL MADE FROM THE PITH OF THE KUNG-FU, AND USED BY THE CHINESE AS A PAINTING SURFACE. BECAUSE OF ITS RESEMBLANCE TO PAPER, OCCIDENTAL PEOPLE ERRONEOUSLY NAMED IT "RICE PAPER".

N. LOUIS ROBERT INVENTOR OF THE FOURDRINIER-TYPE PAPERMAKING MACHINE, SOLD HIS INVENTION TO M. DIDOT IN 1799. TWO YEARS LATER, HOWEVER, HE WON BACK HIS RIGHTS BECAUSE DIDOT WAS SLOW IN MEETING HIS PAYMENTS TO HIM.

THE GREETING CARD INDUSTRY, THE NATIONAL TRADE ASSOCIATION OF GREETING CARD PUBLISHERS, ESTIMATES THAT ONE AND ONE-HALF BILLION CHRISTMAS CARDS WILL BE MAILED IN THE UNITED STATES DURING THE 1947 CHRISTMAS HOLIDAY SEASON.

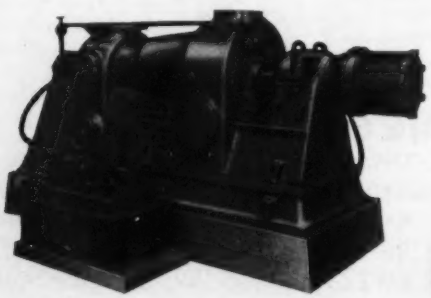


life could be beautiful.....

It certainly could—winter in the South —summer in the North—chicken every day—if we could only apply single-track answers to all problems; for instance, a single refining process to every stock preparatory system.

But, alas and alack! That's not to be, for while refiners will, and often do, take the place of beaters, one has to watch his step when he promotes a refiner as a replacement for a jordan. A refiner is definitely not a "universal" machine.

Although the HYDRAFINER does brush those "precious little fibers" with a very minimum of cutting, and although a HYDRAFINER helps to produce a better sheet than can be "made" in a beater, it is still folly to ask such specialized equipment to do work outside its range of application.



Many HYDRAFINERS already in service, and every installation based on long experience with stock characteristics and mill objectives. Consult us.

SHARTLE BROS. MACHINE CO., Middletown, Ohio

DILTS MACHINE WORKS, FULTON, NEW YORK
Divisions of THE BLACK-CLAWSON CO., Hamilton, Ohio
Associate: Alexander Fleck Limited, Ottawa, Ontario, Canada

HYDRAFINERS

National Safety Congress Issues a Personal Challenge

Edward Benton Fritz Memorial Trophy, grand prize in the paper industry contest

▸▸▸ A BELIEF THAT accidents in the United States can be reduced from 100,000 to 75,000 (each year) by 1950—if every person does his part—was expressed by President Truman in a letter preceding the National Safety Congress which he sent to Ned H. Dearborn, Council president.

That the saving of human life has developed from a purely humanitarian movement into a vital part of the nation's business was evidenced by a gathering of 10,000 persons who attended the 35th annual congress of the National Safety Council, held in Chicago the week of October 6.

Scarcely any work or walk of life is entirely free from some hazard, and the delegates who met in the 140 meetings held during the Congress were enlisted to study and to fight almost every known type of accident. Every individual attending the Congress, as well as every man, woman and child in America, has been asked to adopt the theme of the Congress:

"Be Careful . . . the Life You Save May Be Your Own"

The meetings and exhibits were divided among three hotels. Congress headquarters and many of the sessions were located in the Stevens, and the industrial exhibit was held in the exhibition hall of that hotel. Other sessions were held in both the Congress and the Sherman hotels, and the Public Service Exhibit was on the mezzanine floor of the Sherman.

President Dearborn Points to Promise of Safety

At the annual meeting of the Council, which opened the Congress on Monday morning, Council President Ned Dearborn spoke on "The Public Enemies of Safety." He said that the drive against accidents will fall short of its goal unless the nation is purged of certain ideas and beliefs which he branded as "public enemies." He listed these as:

1) The "Other Fellow" Concept—the idea that an accident will happen to the other fellow, but not to him.

2) The "Your Number's Up" Concept—the idea that accidents are inevitable when the time is right.

3) The "Law of Averages" Concept—the idea that we are doomed by a law of chance.

4) The "Price of Progress" Concept—the idea that we must pay a certain number of lives as the price of progress and scientific advancement.

5) The "Spirit of '76" Concept—the idea that safety is sissy and out of step with the spirit of our pioneer forefathers.

6) The "Act of God" Concept—the idea that accidents are the result of divine will.

Mr. Dearborn made a plea to each of those present to help build in America a new safety faith that this great work may continue to add to the happiness and welfare of all mankind. He said "Ours is a glorious opportunity, a tremendous challenge, a solemn duty."

Mr. Dearborn closed his address by putting the question "What does safety promise?" Highlighting his answer to that question were: "Safety can give us freedom from the fear of accidents . . . Safety can promise 20,000 children a year a chance to live and have fun, a chance to grow up and become men and women . . . Safety can promise freedom from a large amount of unnecessary worry, anxiety and grief . . . Safety can contribute to our national strength, aye, even to world strength."

Fashioning Safety and Its Advertising Plan

Other speakers at the opening session of the Council were Mrs. George W. Jaqua, safety chairman, General Federation of Women's Clubs, and John Sterling, publisher of *This Week*, and a director and chairman of The Industrial Relations Committee, The Advertising Council, Inc.

Mrs. Jaqua spoke from the woman's viewpoint on "The 'New Look' in Safety." Although her remarks sparkled with humor, there was, nevertheless, a poignant undertone, since after all women usually feel the real suffering and tragedy caused by accidents.

Mr. Sterling's subject was "Advertising Saves Lives." He outlined graphically the results of safety programs with respect to advertising and public relations campaigns. This, he pointed out, is controlled largely by trends. Contrasting methods used since World War I, he said, has developed what he termed a new public mindedness.

PAPER AND PULP SECTION

The large number of delegates from member mills in the Paper and Pulp Section taxed the capacity of the room in which the Section gathered for its first session. A registration of all sessions showed a total of 220 persons which topped previous records.

General Chairman E. A. Page opened the first session with a report on the progress made during the past year. He presented, in turn, committee chairmen who spoke briefly of their particular activities and accomplishments. A colorful innovation was introduced by R. W. Croucher, who spoke for the Membership Roundup, which was instituted to build up the membership of the Section now totaling 305. Potential mill members still exceed the number of those now belonging to the Section.

Mr. Croucher appeared on the platform wearing a fine white felt Texas

E. A. Page, general chairman, presided at opening of Paper and Pulp Section

ranger hat, and his pep talk on the subject brought the meeting into a lively mood of fun and good fellowship. See page 1156 for a detailed account of the Membership Roundup.

Accident Trends Are Revealed by Statistics

One important feature of the program each year is a Review of the Paper and Pulp Accident Experience. This presentation by Fred W. Braun, chairman of the Statistics Committee, reveals in plain figures just how the industry rates in its fight against accidents. Summing up the record for 1946, Mr. Braun pointed to the fact that the frequency rate of the paper and pulp industry is still higher than that of 29 other industries; the severity rate is higher than 26 industries.

Safety and the Amateur

The speaker at the opening session was Irving McNair, vice president, Northwest Paper Company, Cloquet, Minnesota, who spoke on the subject "An Amateur Looks at Industral Safety." Mr. McNair spoke informally of the perplexities confronting one who has not given much study to the subject of safety, and of the surprising revelations brought out when one delves into these problems. Mr. McNair's remarks were given with a touch of levity and were enjoyed by the audience.

The Paper Industry Contest

Following the custom established last year, the presentation of safety trophies and other awards given in the Paper Industry Safety Contest took place at the first session.

Chairman Page introduced A. Scott Dowd, chairman of the Contest Committee, to present his report on the 1946-1947 Paper Industry Safety Contest.

Data on the 1946-1947 Paper Industry Safety Contest

The Paper and Pulp Section completed on June 30, 1947, its 23rd consecutive annual safety contest. Two hundred and fifty-seven contesting units of paper and pulp mills and remanufacturing plants reported a total exposure exceeding 328,000,000 man-hours during the contest year, the greatest enrollment of its history.

The average frequency rate of all contestant for the year was 16.37. This was the lowest mark since the contest year of 1940-1941. It was also 26 per cent below the national average of 22.27 for all companies in the paper and pulp industry reporting their experiences to the National Safety Council in 1946. One hundred and seventy-eight plants had rates below the national average.

The average rate of the 198 contestants in the Paper and Pulp Division was 16.38; that of the 59 contestants in the Remanufacturing Division was 16.33. All groups reduced their rates substantially from those of the previous year. Eleven plants complete the contest with perfect records. Two of these were in Group C and four in Group B of Division I; five of them were in Group B of Division II.

Eighty-three plants reduced their rates of the previous year. Fifty-eight plants, or nearly 23 per cent of the entire enrollment had frequency rates of less than 10.

The final standings of contestants ranking 1, 2 and 3 in each group were as follows:

DIVISION I—Paper and Pulp Mills

Group A—Mills averaging more than 130 thousand man-hours per month. Enrollment 65; group's average frequency rate, 14.01.

(1) Consolidated Paper Corp., Ltd., Laurentide Division, Grand Mere, Quebec, Canada; rate 2.12

(2) The Flintkote Co., Pioneer Division, Los Angeles, Calif.; rate 2.17

(3) Kimberly-Clark Co., Lakeview Mill, Neenah, Wis.; rate 2.62

Group B—Mills averaging 60 to 130 thousand man-hours per month. Enrollment 48; group's average frequency rate, 16.56.

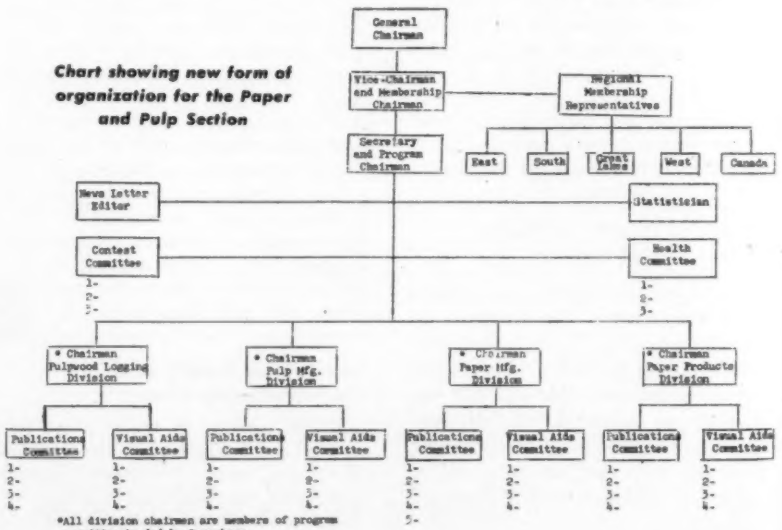
(1) P. H. Glatfelter Co., Spring Grove, Pa.; rate .68

(2) The Flintkote Co., Meridian, Miss.; rate 1.66

(3) Kimberly-Clark Corp., Badger-Globe Mill, Neenah, Wis.; rate 3.10

Irving McNair, vice president Northwest Paper Co., Cloquet, Minn., who spoke at the opening session of the Paper and Pulp Section during the Annual Safety Congress

Chart showing new form of organization for the Paper and Pulp Section



*All division chairmen are members of program committee headed by Secretary.

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National Safety Council group trophies presented by J. E. Long, past president of NSC to representatives of the winning companies. Left to right: Harley B. Goodrich, Strathmore Paper Co., Woronoco, Mass.; Wm. H. McLaughlin, Lily-Tulip Cup Corp., College Point, N. Y.; J. A. Long, Bay West Paper Co., Green Bay, Wis.; R. Duval, Consolidated Paper Corp., Ltd., Grand'Mere, P. Q.; L. L. Clardy, P. H. Glatfelter Co., Spring Grove, Pa.; Ernest Dutcher, Pioneer Div., The Flintkote Co., Los Angeles, Calif.; J. E. Long, National Safety Council; J. Maertzweiler, Kimberly-Clark Corp., Memphis, Tenn. Norman W. Anderson, Gaylord Container Corp., Milwaukee, Wis.; C. K. Rosenfield, Certain-teed Products Corp., York, Pa.; A. A. Zeiss, Certain-teed Corp., East St. Louis, Ill.; A. H. Kogler, Certain-teed Products Corp., Buffalo, N. Y.

Group C—Mills averaging 30 to 60 thousand man-hours per month. Enrollment 52; group's average frequency rate, 28.93.

(1) Certain-teed Products Corp., East St. Louis, Ill.; rate .00

(1) Certain-teed Products Corp., York, Pa.; rate .00

(3) Strathmore Paper Co., West Springfield, Mass.; rate 1.43

Group D—Mills averaging 6 to 30 thousand man-hours per month. Enrollment 33; group's average frequency rate, 25.87.

(1) Strathmore Paper Co., Mill No. 1, Woronoco, Mass.; rate .00.

(1) E. I. du Pont de Nemour Co., Inc., Russell, Mass.; rate .00

(1) Certain-teed Products Corp., Buffalo, N. Y.; rate .00

(1) International Paper Co., Riley Mill, Maine; rate .00

DIVISION II—Paper and Board Remanufacturing

Group A—Plants averaging 47,500 or more man-hours per month. Enrollment 28, group's average frequency rate, 15.60.

(1) Lily-Tulip Cup Corp., College Point, N. Y.; rate 3.92

(2) Oswego Falls-Sealright Corp., Cap Division, Fulton, N. Y.; rate 4.71

(3) Container Corporation of America, Boston, Mass.; rate 5.48

Group B—Plants averaging less than 47,500 man-hours per month. Enrollment 31; group's average frequency rate, 19.09.

(1) Kimberly-Clark Corp., Memphis, Tenn.; rate .00

(1) Old Colony Envelope Co., Westfield, Mass.; rate .00

(1) The Flintkote Co., Hollywood Paper Box Division, Hollywood, Calif.; rate .00

(1) Gaylord Container Corp., Milwaukee, Wis.; rate .00

(1) Bay West Paper Co., Green Bay, Wis.; rate .00

Seventy-two contestants won Special Reduction Award Certificates from the National Safety Council, having frequency rates below their respective group averages, and showing reductions by comparison with their rates in the previous contest.

Outstanding records of perfect scores of no accidents for continuous periods of time up to the close of the contest are the following:

Strathmore Paper Co., Mill No. 1, Woronoco, Mass. (Division I—Group D)—10 years and 5 months.

Bay West Paper Co., Green Bay, Wis. (Division II—Group B)—10 years and 19 days.

National Safety Council Trophies and Certificates

Plaque trophies donated by the National Safety Council are being awarded to the contestants in each group whose ranks are number one, including all perfect scores.

Certificates are being awarded to those whose ranks are two and three in each group.

In addition to these awards, are *Certificates of Achievement* given by the Council to the 72 contestants that won the Special Reduction Awards.

The 1947-1948 Contest is in its fourth month. Close to 300 units are enrolled. A major change has been made this year in the grouping of contestants which will place the largest plants in the industry into groups of more comparable man-hour exposure. This new arrangement is as follows:

DIVISION I—Paper and Pulp Mills

Group	Units Averaging Man-Hours Monthly	Approx. Number of Employees
A	170,001 or more	1000 or more
B	85,001 to 170,000	500 to 1000
C	42,501 to 85,000	250 to 500
D	6,000 to 42,500	36 to 250

DIVISION II—Paper and Board Remanufacturing

Group	Unit Averaging Man-Hours Monthly	Approx. Number of Employees
A	85,000 or more	500 or more
B	35,001 to 85,000	200 to 500
C	Less than 35,000	less than 200

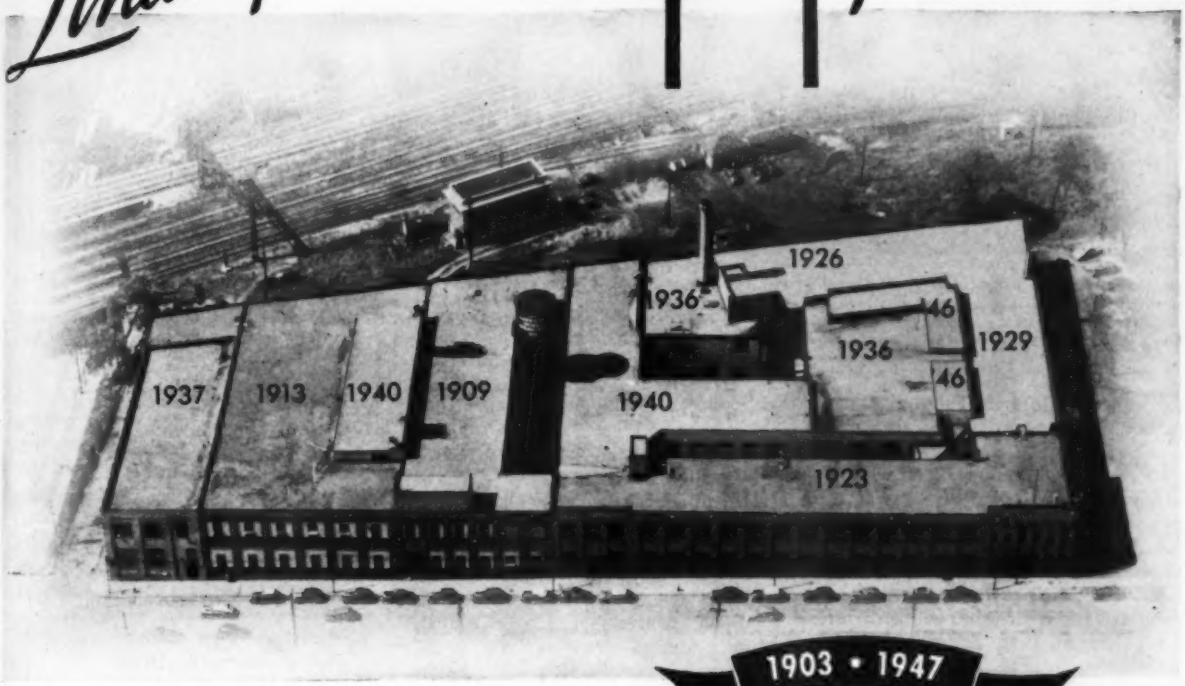
National Safety Council Contest Awards Presented

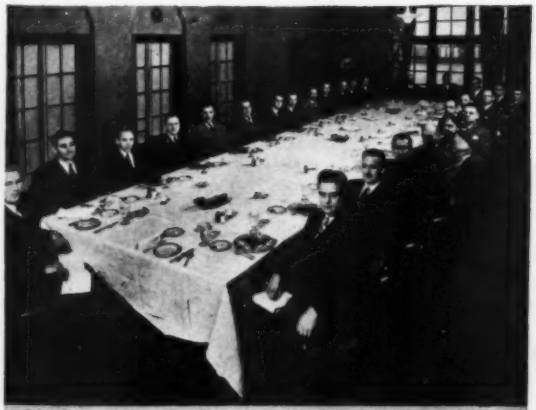
In each annual contest, trophies are awarded by the National Safety Council to contestants in each group that rank Number One; this rank includes all perfect scores. Certificates are given to the mills that rank two and three in each group.

In addition, Achievement Certificates are awarded to each unit (except first, second, and third place) having a frequency rate below the group average, and also showing a reduction to rate by comparison with its rate in the previous contest. The number of these special reduction awards this year totaled 72 as compared with 59 the previous year.

Following the reading of group

Lindsay Wires are 44 years old—





Lindsay organization men meet . . . quality of product uppermost.

An organization survives and thrives best when it fosters and satisfies a customer demand for quality. The product, in order to live, must improve as it ages and must assist definitely in contributing to the customer's product. Lindsay Fourdrinier wires, improving with the progress of paper manufacture, speak for the value of insistent research and for our personnel's earnest desire to advance still further the future of both the wire-weaving and paper-making industries.

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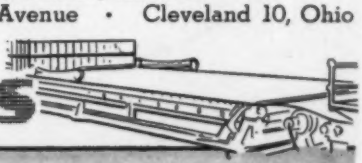
Lindsay **WIRES**



FOR PAPER MILLS

Second and third winners in each group of the Contest were awarded certificates by the National Safety Council. Several representatives are shown here after these presentations by J. E. Long, of NSC. Left to right; Harley B. Goodrich, Strathmore Paper Co., West Springfield, Mass.; Fred Bentzen, Kimberly-Clark Corp., Neenah, Wis.; J. E. Long, National Safety Council; E. E. Glomstead, Kimberly-Clark Corp., Neenah; Ernest Dutcher, Pioneer Div., The Flintkote Co., Los Angeles, Calif.; R. M. Bailey, The Flintkote Co., Meridian, Miss.

awards to contestants, Mr. Dowd turned the meeting over to J. E. Long, a past president of the National Safety Council. Mr. Long has become a regular participant in this part of the pogram as he has acted for the Council for a number of years in presenting its awards for the Paper and Pulp Section. Following a warm greeting and congratulations to the winners, Mr. Long presented to delegates of the winning mills (a) the NSC Group Trophies; (b) Group Certificates, and (c) Certificates of Achievement.

Certificate of Achievement

DIVISION I—Paper and Pulp Mills

Group A

Hollingsworth & Whitney Co. (Algonquin & Taconnet Div.), Waterville, Me.

Brown Corp., LaTuque (Que.), Can.

Price Brothers & Co., Ltd., Riverbend (Que.), Can.

The Flintkote Co., New Orleans, La.

West Virginia Pulp & Paper Co., Tyrone, Pa.

Bird & Son, Inc., East Walpole, Mass.

Wood Conversion Co., Cloquet, Minn.

Price Brothers & Co., Ltd., Kenogami (Que.), Can.

The Mead Corp., Chillicothe, Ohio

The Gardner-Richardson Co., Lockland, Ohio

The Ontario-Minnesota Pulp & Paper Co., Ltd., Fort Frances (Ont.), Can.

Rhinelander Paper Co., Rhinelander, Wis.

Anglo-Newfoundland Development Co., Ltd., Grand Falls (N.F.), Can.

Bathurst Power & Paper Co., Ltd., Bathurst (N.B.), Can.

International Paper Co. (Hudson River Div.), Palmer, N. Y.

Kimberly-Clark Corp., Kimberly, Wis.

International Paper Co. (Otis Div.), Chisholm, Me.

Marathon Corp., Menasha, Wis.

Nekoosa-Edwards Paper Co., Fort Edwards, Wis.

North Carolina Pulp Co., Plymouth, N. C.

Mersey Paper Co., Ltd., Liverpool, N. S.

Kieckhefer Container Co., Delair, N. J.

Group B

The Ontario-Minnesota Pulp & Pa-

Group of Kimberly-Clark representatives who attended the meetings of the Paper and Pulp Section during the Annual Safety Congress

Get Clean Compressor Valve Operation With ...

STANOIL

These four discharge valves are shown just as they came from the compressor after 7 months operation (2,700 hours). The close-up view above shows how clean the valves were.

Excessive deposits on compressor discharge valves troubled a midwest lumber manufacturer. A new intake air filter failed to stop deposit formation. The operator was almost convinced that shutdowns for valve cleaning could not be avoided. But he took the suggestion of a Standard Oil Lubrication Engineer and tried Stanoil.

That was five years ago. Since then, he has not had a forced shutdown to clean valves. On a routine inspection, after seven months' operation (2,700 hours), valves were found to be free from deposits—just as they appear in the photographs.

Even a short run will convince you that oxidation-inhibited Stanoil is an ideal compressor lubricant. Arrange to have a Standard Oil Lubrication Engineer help you test it. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

A large number of mills (72) entered in the paper industry contest were awarded certificates of achievement for accident reduction. Shown here are: FRONT ROW (L to R)—C. H. Kemp, Thilmany Pulp & Paper Co., Kaukauna, Wis.; G. J. Bienvenu, Gaylord Container Corp., Bogalusa, La.; Geo. W. Harper, The Mead Corp. (repr. Harriman and Sylva Divisions); Francis H. Wagner, The Mead Corp., Chillicothe, Ohio; Fred T. Morrish, Ontario-Minnesota Pulp & Paper Co., Ltd., Fort Frances, Ont.; Geo. M. Williams, Nekoosa-Edwards Paper Co., Port Edwards, Wis.; Robert K. Meredith, West Virginia Pulp & Paper Co., Tyrone, Pa.; A. E. Minor, Ontario-Minnesota Pulp & Paper Co., Ltd., Kenora, Ontario; Carl A. Krenkel, Kimberly-Clark Corp., Kimberly, Wis.; B. D. Rogers, Bird and Son, E. Walpole, Mass.; Lorne F. Perron, Fraser Companies, Ltd., accepting award for Fraser Paper, Ltd. . . . BACK ROW—(L to R)—Harry L. Bode, Gaylord Container Corp., St. Louis, Mo.; H. T. Hebert, The Flintkote Co., New Orleans, La.; D. D. Lightfoot, Kimberly-Clark Corp., Appleton, Wis.; G. E. Allen, Wood Conversion Co., Cloquet, Minn.; A. J. Basile, Lawrence Paper Co., Lawrence, Kans.; C. C. Walter, The Gardner-Richardson Co., Lockland, Ohio; Robert Jaskowick, The Ohio Boxboard Co., Rittman, Ohio; Fred Berry, Alton Box Board Co., Alton, Ill.; R. J. Hutchison, The Flintkote Co., Little Ferry, N. J.; J. R. Bouchard, Brown Co., LaTuque, Que.; D. V. Hill, The Mead Corp. (Heald Div.), Lynchburg, Va.; Arthur Carle, The Northwest Paper Co., Cloquet, Minn.

per Co., Ltd., Kenora (Ont.), Canada.

International Paper Co. (Southern Kraft Div.), Mobile, Ala.

Thilmany Pulp & Paper Co. (Upper Mill), Kaukauna, Wis.

Hoberg Paper Mills, Inc., (Hoberg Div.), Green Bay, Wis.

Bemis Brothers Bag Co., Peoria, Ill.

St. Croix Paper Co., Woodland, Me.

Fraser Paper Ltd., Madawaska, Me.

International Paper Co., North Tonawanda, N. Y.

Thilmany Pulp & Paper Co. (Lower Mill), Kaukauna, Wis.

Container Corp. of America, Wabash, Ind.

Cornell Wood Products Co., Cornell, Wis.

The Mead Corporation (Heald Div.), Lynchburg, Va.

Group C

The Mead Corp., Sylva, N. C.

Container Corp. of America, Circleville, Ohio

Certain-teed Products Corp., Savannah, Ga.

Certain-teed Products Corp., Marseilles, Ill.

Crown Zellerbach Corp. (Crown Willamette Paper Co. Div.), Comas, Wash.

Container Corp. of America, Carthage, Ind.

Rising Paper Co., Housatonic, Mass.

Hollingsworth & Vose Co., West Groton, Mass.

Certain-teed Products Corp., Richmond, Calif.

Central Fibre Products Co., Tama, Iowa

The Flintkote Co., Little Ferry, N. J.

Whiting Plover Paper Co., Stevens Point, Wis.

The Mead Corp., Harriman, Tenn.

The Lawrence Paper Co., Lawrence, Kans.

Lee Paper Co., Vicksburg, Mich.

The Northwest Paper Co., Brainerd, Minn.

Group D

Alton Box Board Co., Carlyle, Ill.

Fort Wayne Corrugated Paper Co., Vincennes City, Ind.

Container Corp. of America, Wilmington, Del.

United States Gypsum Co., Oakmont, Pa.

American Writing Paper Corp. (Mount Tom Div.), Holyoke, Mass.

Fort Wayne Corrugated Paper Co., Hartford City, Ind.

American Writing Paper Corp. (Parsons Div.), Holyoke, Mass.

International Paper Co., Livermore Falls, Me.

DIVISION II—Paper and Board Remanufacturing

Group A

Container Corp. of America, Cleveland, Ohio

Gaylord Container Corp., St. Louis, Mo.

The Container Co., Van Wert, Ohio

Container Corp. of America, Cincinnati, Ohio

The Ohio Boxboard Co. (Carton Div.), Rittman, Ohio

Gaylord Container Corp. (Container Div., Box & Bag Div.), Bogalusa, La.

Container Corp. of America, Anderson, Ind.

Group B

Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.

Bird & Son, Inc., Chicago, Ill.

Fort Wayne Corrugated Paper Co., Pittsburgh, Pa.

Kimberly-Clark Corp. (Atlas Mill), Appleton, Wis.

Container Corp, of America (Sixth Street Div.), Philadelphia, Pa.

South West Box Co., Sand Springs, Okla.

Container Corp. of America, Rock Island, Ill.

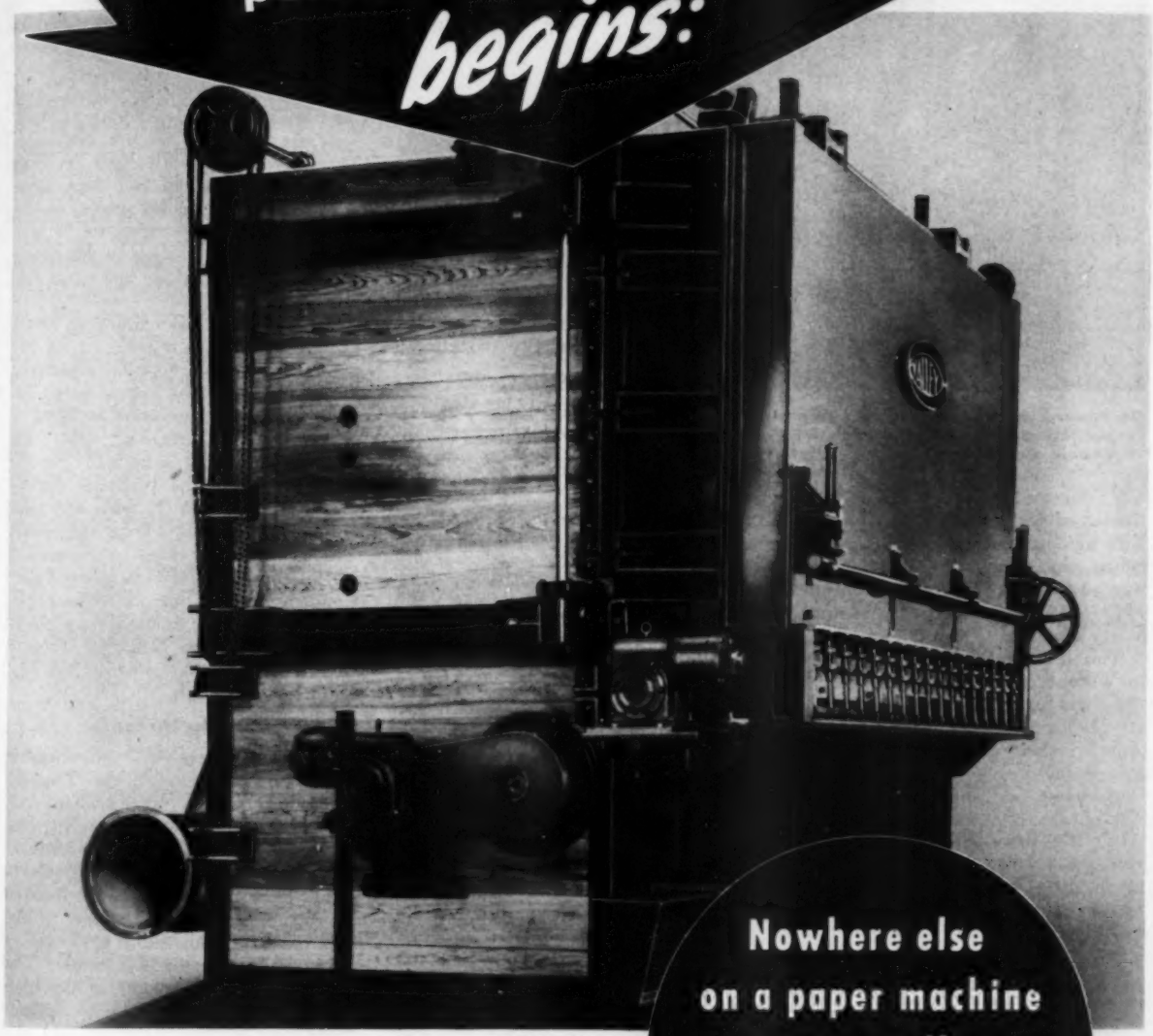
After the group trophy and certificate presentations had been made, Mr. Dowd again took the floor and read the final and much anticipated climax of his Contest Report.

Edward Benton Fritz Memorial Trophy

The winner of the Edward Benton Fritz Memorial Trophy, donated by Fritz Publications, Inc., Chicago, publisher of THE PAPER INDUSTRY AND PAPER WORLD, is the contestant which by a majority vote of five judges, named in the rules, has in their opinion made the best safety achievement among the paper and pulp mill participants in the contest, based upon frequency, man-hours worked, physical conditions, and other contributing factors.

The winner of this Grand Prize in the 1946-1947 Contest is the Strathmore Paper Company, Mill No. 1, Woronoco, Massachusetts, which tops

This is where a perfect shipping roll *begins:*



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You will get *better* results from inlet and head box by Valley.

VALLEY IRON WORKS CO. Appleton, Wisconsin

FORMATION CALIPER LEVEL SHEET INCREASED SPEED HIGHER TEST

The Edward Benton Fritz Memorial Trophy—grand prize in the Paper Industry Safety Contest—is presented by Mrs. Fritz to H. B. Goodrich, maintenance and safety engineer, Strathmore Paper Company. The trophy was awarded to this company's No. 1 Woronoco mill

the list of perfect scores in Group D. This mill has not had a lost-time accident since January 28, 1937. It was awarded the Major Prize in the 1939-1940 Paper Industry Annual Safety Contest.

This mill of Strathmore is located in Woronoco, about 12 miles west of the main office in West Springfield. Its products are fine writing papers. Approximately 100 men and women are employed.

Accident prevention work was started about 1913. The president, G. E. Williamson, always has been active in this work and in the early years of the Paper and Pulp Section served as its chairman.

A Central Safety Committee, composed of nine, is directly responsible for the safety work in all three of the company's mills. This committee is headed by the vice president in charge of production. Other members are the president, manager of industrial relations, chief engineer, three superintendents, and two safety engineers. Meetings are held monthly.

The Mill Safety Committee is made up of one representative from each department, chosen by the superintendent and officers of the local Brotherhood of Paper Makers.

Interest in safety among the workers is maintained by safety contests among the three mills operated by the company. The award for winning this annual inter-mill contest each year has been a steak roast and field day, held usually in June.

The company attributes its successful accident prevention work to the personal contact it has with individual employees. Safety is stressed at all times.

Our Section has taken to its heart a lady who, since 1939, has been awarding the *Edward Benton Fritz Memorial Trophy* to winners of these annual safety contests of our industry. As vice president and treasurer of Fritz Publications, Chicago, donor of the award, she has represented her husband, who as a pioneer of safety in the paper and pulp mills of North America, personally awarded this prize to mill winners for many years previous to his death. Mrs. Fritz always has given us an inspiring and encouraging message, and it becomes my pleasure again to present our friend and ask her to present the Grand Prize.

The Grand Prize Is Presented by Mrs. Fritz

"As usual, it gives me great pleasure to be here with you again, and I have looked forward to it with inspired interest. I am sure if my late husband could look in on this meeting today he would be happy to know that I am carrying on for him.

"It has come to me through the years that I have been associated with you that these Congress meetings should mean a great deal to you, for they afford such splendid opportunities to blend your ideas into plans of durable dependency, and I am sure they are helping some of you to forge substantial links in the chain of brotherhood which should help to bring all of the States and Canada closer together and to get away from the old idea of mill secrets which usually leak out through someone.

"When I was a young woman, I attended a chautauqua at which one of the lecturers took for his subject 'Dead Lions.' A few points on that subject stand out as clearly today as the day I heard it. His 'lions' were: greed, malice, envy, jealousy, hate, selfishness, injustice, ingratitude, and the like, and he said 'As long as these lions are with us, we are not safe. The only safety with lions is with dead ones.' And so I feel these Congress meetings should prove to be guideposts along the road to victory over these lions which can be eliminated by right thinking and good fellowship.

"My husband, Edward Benton Fritz, had a great warmth in his heart for paper mill men, having been associated with them for many years. He so enjoyed visiting the mills and he loved to take me through them at times. He also had a big place in his heart for the organization of the National Safety Congress, and that is why we have an Edward Benton Fritz Memorial Trophy to present today to the winner of this contest—The Strathmore Paper Company, of Woronoco, Massachusetts. It gives me extraordinary pleasure to present this Memorial Trophy to the Strathmore representative, Mr. Harley B. Goodrich."

Paper Finishing Hazards

A paper which drew considerable discussion was read at the Tuesday afternoon session by William C. Berthold, assistant superintendent, finishing operations, The Mead Corporation, Chillicothe, Ohio. Mr. Berthold's subject was "Hazards Related to Paper Finishing Operations." The treatment of this subject showed a great deal of study and research. The obstacles to be overcome in finishing operations were outlined with suggestions, and the entire presentation was altogether comprehensive. [*Mr. Berthold's paper appears in toto on page 1200 of this issue.*]

Paper Products Problems —a Symposium

The second half of the Tuesday session was given over to a symposium on "Selected Problems in Paper Products Manufacturing." There were four papers:

(a) *Bag Manufacturing Hazards*—Clifford Kemp, safety director Thilmany Pulp & Paper Co., Kaukauna, Wis.

(b) *Waxing and Lamination Hazards*—Robert D. Caine, superintendent, Wax & Parchment Production,

Kalamazoo Vegetable Parchment Co., Parchment, Mich.

(c) *Asphalting Hazards*—Emil G. Woodman, safety engineer, The Ruberoid Co., Joliet, Ill.

(d) *Carton Manufacturing Hazards*—John Reimer, superintendent, Carton Manufacture, Marathon Corp., Menasha, Wis.

Mr. Kemp covered specifically:

Machine Guarding—He stressed mechanical guarding, first; he then pointed to what might be termed "X" hazards that are created by operators who wear improper clothing, jewelry, etc. *Good Housekeeping*—Adequate equipment and good organization. *Rules and Safe Practices, Daily Inspection Routine.*

Mr. Caine stated that KVP had analyzed the accident history of the wax production department for a period of ten years—1937 through 1946. This department employs approximately 180 men who work on a three-shift basis, 24 hours per day. Most of the equipment and materials handled are heavy. The production area is rather congested because of its expansion in recent years, and the addition of overhead paper handling equipment which was not incorporated in the original layout. It was found that the type of accidents occuring in the waxing operations parallel, to a large extent, those experienced in the plant as a whole . . . the department's frequency rate was about 40 per cent higher on the accidents common to the entire plant. Twenty-four per cent of all accidents occurring in this department involved falling objects.

Mr. Woodman opened his talk with an anonymous quotation—"He who thinks by the inch and talks by the yard will sooner or later be dealt with by the foot." The speaker classified the hazards common to an asphalt plant into three groups: (1) Asphalt Burns, (2) Mechanical Hazards, (3) Fire Hazards. He summed it all up in the following conclusions:

(1) That asphalt burns are a defiite hazard which largely can be controlled by safe methods of procedure plus the constant wearing of protective clothing and equipment.

(2) That of all mechanical hazards in the plant there are two outstanding ones, (a) unguarded and exposed nip rolls; (b) powered lift trucks, both of which can be eliminated through effective guarding.

(3) That asphalt fires can be a serious menace unless properly controlled by adequate, up-to-date protective equipment plus trained personnel.

H. E. Heubner, elected general chairman of the Paper and Pulp Section

DINNER-BUSINESS MEETING

Ninety-two men and two women attended the dinner on Tuesday evening. Harry Huebner, vice chairman of the Section, presided. The affair, which has been a custom for some years, gives delegates an opportunity for making new friends and having fun in an exchange of mill anecdotes and experiences. It inspired one of the Section's true friends to make a heart warming appeal for service to the small mill and plant. E. C. Jacobs, field representative of the American Mutual Liability Insurance Company, New York City, related his experiences to show that small organizations frequently have high accident records which could be improved by more and better contacts with the Paper and Pulp Section and its committees. Mr. Huebner pointed out that a reduction of accidents in small plants will naturally help to lower the insurance rates for both large and small plants.

A question was asked by the representative of one large group of mills whether the special reports of individual accidents in the Safety Contest that are required by the Council to be written on its standard form, could not be submitted in a copy of the mill's own customary form of reporting its accidents. The economy and convenience of the latter method was motive for asking for a change. The matter will receive the Council's consideration and study.

Following the round-table discussion, J. Fred Berry, chairman of the Nominating Committee read the slate of officers and committees for the coming year. The report was accepted and the following officers and committeemen elected.

The dinner meeting of the Paper and Pulp Section was presided over by H. P. Heubner, vice chairman in charge of membership. At Mr. Heubner's right is J. Fred Berry, a past general chairman of the section and member of the Program Committee; at his left is retiring chairman, E. A. Page

Newly Elected Executive Committee

The following new officers and committees were elected to serve for the year 1947-1948:

Officers

General Chairman—H. P. Heubner, The Flintkote Co., New York City.

Vice Chairman and Membership Committee Chairman—R. W. Croucher, Minnesota and Ontario Paper Co., International Falls, Minn.

Secretary and Program Chairman—George W. Harper, Mead Corp., Chillicothe, Ohio.

News Letter Editor—D. J. Brett, Jr., National Container Corp., Jacksonville, Fla.

Statistician—Fred W. Braun, Employers Mutual Insurance Co., Wausau, Wis.

Regional Membership Representatives: East—James McGivney, Brown Co., Berlin, N. H.; South—C. L. R. Dougherty, Union Bag and Paper Corp., Savannah, Ga.; Great Lakes—Walter E. Strong, Marathon Corp., Menasha, Wis.; West—Ernest Dutcher, The Flintkote Co., Los Angeles, Calif.; Canada—Douglas B. Chant, The Ontario Pulp and Paper Makers Safety Association, Toronto, Ont.

Committees

Health Committee—Dr. James D. Stark (Chairman), Hammermill Paper Co., Erie, Pa.; Dr. Paul A. Brehm, State Board of Health, Madison, Wis.; R. P. Pennings, National Container Corp. of Wisconsin, Tomahawk, Wis.; C. A. Beach, Federal Sanitation Co., Milwaukee, Wis.

Contest Committee—A. Scott Dowd (Chairman), Fritz Publications, Inc., Chicago; W. R. Cahill, Nekoosa-Edwards Paper Co., Port Edwards, Wis.; Ben D. Rogers, Bird & Son, Inc., East Walpole, Mass.

Pulpwood Logging Division

A. E. Minor (Division Chairman), Ontario-Minnesota Pulp and Paper Co., Ltd., Kenora, Ontario, Can.

Publications Committee — A. H. Owens (Chairman), Brunswick Pulp and Paper Co., Brunswick, Ga.; Arthur Nelson, The Flintkote Co., Meridian, Miss.; Seth Jackson, U. S. Forest Service, Washington, D. C.; Laurent Girard, Consolidated Paper Corp., Grand Mere, P.Q., Can.

Visual Aids Committee—Fred T. Morrish (Chairman), Ontario-Minnesota Pulp and Paper Co., Fort Francis, Ontario, Can.; J. E. Cantin, Quebec-North Shore Paper Co., Baie Comeau, Quebec, Can.; James M. Milne, Donnacona Paper Co., Donnacona, Quebec, Can.; C. F. Taylor, Maine Seaboard Paper Co., Bucksport, Me.

Pulp Manufacturing Division

C. J. Munk (Division Chairman), Racquette River Paper Co., Potsdam, N. Y.

Publications Committee—R. Chapman (Chairman), Howard Smith Paper Mills, Ltd., Cornwall, Ontario, Can.; A. S. Cook, Quebec Paper & Pulp Safety Association, P. Q., Can.; Cyril D. McCan, Crossett Paper Mills, Crossett, Ark.; Julius A. Draper, Consolidated Paper Corp., Ltd., Grand Mere, P. Q., Can.

Visual Aids Committee—C. C. MacPike (Chairman), Florida Pulp and Paper Co., Cantonment, Fla.; George S. Nelson, Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis.; Thomas Furness, Champion Paper & Fibre Co., Canton, N. C.; H. B. Gaylord, North Carolina Pulp Co., Plymouth, N. C.

Paper Manufacturing Division

H. B. Goodrich (Division Chairman), Strathmore Paper Co., West Springfield, Mass.

Publications Committee — G. R. Leonhardt (Chairman), Paterson Parchment Paper Co., Bristol, Pa.; Edward Lum, Beckett Paper Co., Hamilton, Ohio; Arthur Carle, Northwest Paper Co., Cloquet, Minn.; E. V. Johnson, Kimberly-Clark Corp., Neenah, Wis.; H. E. Newbury, Ecusta Paper Corp., Pisgah Forest, N. C.

Visual Aids Committee—George H. Pearce (Chairman), Bathurst Power & Paper Co., Bathurst, N. B., Can.; Stanley C. Brown, Ontario Pulp and Paper Co., Thorold, Ontario, Can.; T. Jackson English, Kieckhefer Container Corp., Delair, N. J.; B. J. McCloskey, Hoberg Paper Mills, Green Bay, Wis.

Membership Roundup

Mr. Croucher brought a bit of atmosphere into the opening session of the Paper and Pulp Section when he appeared in this Ranger Hat to give an account of the Membership Roundup

R. W. Croucher, safety officer of Minnesota and Ontario Paper Company and subsidiaries, and newly elected general vice-chairman of the Pulp and Paper Section of National Safety Council, has been named Roundup Boss of that Section as part of the Council's Fall Roundup drive for new members. This drive began October 1 and will run until December 31 in the form of a contest among the Council's Sections.

Mr. Croucher will assist John Young, supervisor of safety of International Harvester Company, Roundup Boss of the Council's general drive, in pointing out how accident prevention can lower business costs. Among the members of the Pulp and Paper Section are many concerns that have appreciably reduced the manufacturing cost of their finished products by eliminating from their overhead the direct and hidden items of industrial injuries.

Mr. Croucher has submitted the following statement concerning the Roundup Drive:

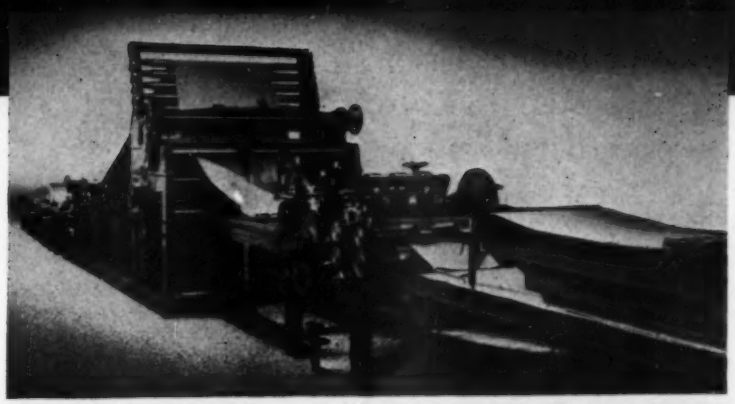
"Membership in the National Safety Council is like having another technical assistant to the production chief. It brings him specializer services for his accident prevention problems that would cost him many times the Council's membership fee if he were to try to search them out himself. It is a self evident truth that the larger the membership the greater the opportunities for the Council to cover the ground completely, to the special benefit of present members.

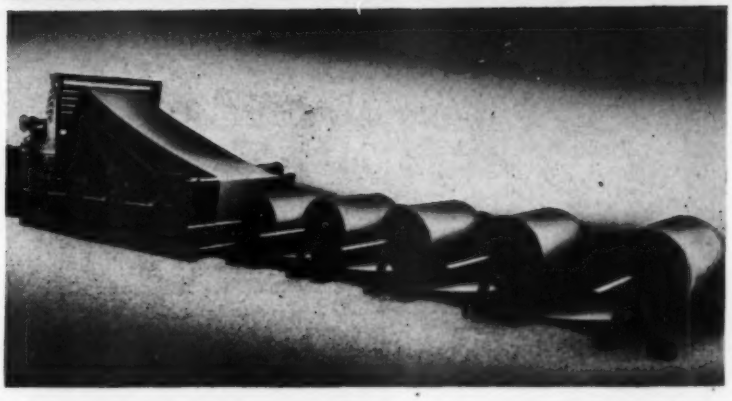
"Therefore, participation in this campaign of "Every Member Get a Member" is merely a sensible idea of self advancement. Greater activity in our Section, resulting from increased membership, will inevitably work to a reduction in the industry's accident frequency rate. Present sectional members do not believe that the inherent hazards of pulp and papermaking and their allied products warrant the current frequency rate of double those of the rubber and textile mills, and 50 per cent higher than the all-industry rate.

"Each member of the Executive Committee of the Paper and Pulp Section has been provided by Roundup Boss Croucher with a list of firms connected with the industry and who are not yet members of the National Safety Council. Each member is expected to choose from the list concerns that are located in his vicinity, notifying the Roundup Boss of his choice, so that duplications of contacts may be avoided. The committee member will enlist the services of lay members of the Section to assist him in enrolling the new members. By this concentrated and co-ordinated action it is anticipated that very few eligible prospects will be outside the fold at the end of the campaign. Indeed, the campaign actually will not end at the close of the year. The committee will not be satisfied until all prospects are enrolled.

"Efforts of present members will not be confined to the paper industry, however. Any firm within their scope that can be benefited by Council membership will be approached, because we believe the gospel of safety should be brought to all, and not confined to selected groups."

HOW TO INCREASE FLAT BAG PRODUCTION





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The Flat Bag Tuber illustrated is equipped with the latest cross pasting units and new compensating drive for making 5-wall, pasted bottom bags. S & W Tubers and Bottomers are designed for maximum production and a minimum of spoilage.

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LEFT—Sixteen persons attended this conference—one of four held Thursday afternoon—and discussed Woods and Logging Operations. RIGHT—Another conference on Pulp Mills and Wood Yards was attended by about thirty delegates

Paper Products Division

H. H. Aderhold (Division Chairman), Marathon Corp., Menasha, Wis.

Publications Committee—W. H. McLaughlin (Chairman), Lily-Tulip Cup Corp., Long Island, N. Y.; G. J. Bienvenu, Gaylord Container Corp., Bogalusa, La.; Charles Weed, Michigan Carton Co., Battle Creek, Mich.; William D. Guiness, The Flintkote Co., New York City.

Visual Aids Committee—James B. Sullivan (Chairman), Container Corp. of America, Chicago; John Meinhardt, Gaylord Container Corp., St. Louis, Mo.; Vincent Conlon, The Sealright Co., Inc., Fulton, N. Y.; A. J. Basile, Lawrence Paper Co., Lawrence, Kan.

Pulpwood Loggers Group

Scheduled to preside over this session was James A. McGivney, safety director, Brown Company. However, Mr. McGivney was unable to be present at the Congress, and I. W. Laughlin, of Liberty Mutuals Insurance Company, substituted for him.

"The Foreman's Responsibility for Safety in Woods Operations" was the subject of a paper read before this session by Alben Keenan, assistant superintendent woods operations, Hollingsworth & Whitney Company, Waterville, Maine.

The speaker pointed to the fact that woods operations is classed as the second most hazardous occupation—mining is the only occupation which has a lower standing in the National Safety Council list. Mr. Keenan also referred to the cost of woods accidents—insurance rates on woods operations have brought this point very sharply to the attention of employers, many of whom have come to the conclusion that something can be done about it, and are proceeding to do it. These employers are putting serious thought into the planning of carefully worked out safety programs and following them through. The foreman is by far the most important cog in the operation of any woods safety campaign, according to Mr. Keenan. The camp may be isolated—visited infrequently by supervisors. One 10,000 cord job may cover an area of 1,000 acres or even more, and the foreman is the man who sees all of the men practically every day, or at least several times weekly. Weather conditions bring many severe changes in the woods and the foreman is responsible for the safety of the men—and the horses where they are used. If the foreman has sufficient interest in keeping his men accident-free, he can be a powerful force in accident prevention. Without the active interest and co-operation of the foreman on the job, any attempt to improve safety performance has two strikes on it at the start.

Julius A. Draper didn't trust busses or taxicabs to take him around Chicago while he was attending the National Safety Congress. He brought his own bicycle and enjoyed riding through the parks and boulevards between sessions. Mr. Draper, who is with Consolidated Paper Corporation, Ltd., Montreal, is shown here on his "bike" as he wheeled out of the Stevens Hotel

The second paper read before this session was by Dr. Arnold E. Hanson, director company relations, Brown Company, Berlin, New Hampshire. Dr. Hanson spoke on "Some Approaches to Accident Prevention in Woods Operations."

Directly after Dr. Hanson's address, there was a short period of discussion followed by a showing of "King Spruce," a technicolor-sound motion picture on woods operations. This film was shown through the courtesy of the owner, the Brown Company. The picture depicted logging operations with safety as a dominant feature. However, romance in the north woods mingled with modern design.

FOUR CONFERENCES

A new idea in the dissemination of safety information was tried out this year when four major phases of paper industry operations were treated independently in four round-table sessions held simultaneously on Thursday afternoon. Each session was directed by a leader and an expert, with a recorder taking down the proceedings.

Woods and Logging Operations

About 16 were present at this conference which was led by R. W. Laughlin, of Liberty Mutual Insurance Company, Portland, Maine. Discussions were centered on questions of medical service in isolated locations; how to sell the safety rule which prohibits the use of double-bitted axes; how to prevent accidents from wood hooks, and what types of safety committees are most valuable.

The question of medical service in

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LEFT—Conference No. 3 on Paper Machines and Finishing, drew a large attendance of about fifty. RIGHT—Paper Products and Paper Converting was the subject discussed at the fourth conference with twenty-five in attendance

isolated locations was discussed at length. In the summary, it was pointed out that permanently appointed, well-trained, first-aid men should be sent to logging areas, and that any orders or setups should be done only through the supervision of a capable physician.

Summing up the discussion on the importance of safety committees, it was the consensus that a systematic training program has been tested and found to show results; however, any organized safety system must have the backing of management to be successful.

E. A. Page, Kimberly-Clark Corporation, acted as recorder for this conference.

Pulp Mills and Woodyards

Approximately 30 delegates were present at this conference, which was under the leadership of C. L. R. Dougherty, of Union Bag and Paper Corporation, Savannah, Georgia. Fred T. Morrish, of Ontario-Minnesota Pulp & Paper Co., Ltd., Fort Francis, Ontario, served as expert. E. V. Johnson, Kimberly-Clark Corporation, Neenah, Wisconsin, acted as recorder.

The question of how to prevent puncture wounds caused by accidents from handhooks was roundly discussed. A majority indicated the use of picaroons as handhooks. The use of shin guards and heavy leather aprons has eliminated wood handling accidents in one mill for a period of 18 months. The leather apron is attached so that it extends from the waist down to the top of the guard which has been placed along the front of the shin. One commented that they were using a fiber guard strap on the forearm of the left arm to protect the worker from puncture wounds when using short picaroons.

The use of a safety belt is common in drum barking operations, especially in connection with the return conveyor. The belt is such that a man can walk along and cover the area along the walk and still have the belt attached.

There were discussions of many other questions relating to safe practices in woodyards and pulp mills.

Paper Machines and Finishing

Fifty delegates attended this conference which was under the leadership of D. J. Brett, National Container Corporation, Jacksonville, Florida. The expert for this group was William C. Berthold, The Mead Corporation, Chillicothe, Ohio.

A complete transcript of the twenty questions discussed at this conference, as recorded by H. B. Goodrich, Strathmore Paper Company, West Springfield, Massachusetts, appears elsewhere in this issue (see page 1201).

Paper Converting and Paper Products

This session drew about twenty-five delegates. G. J. Bienvenu, Gaylord Container Corporation, Bogalusa, Louisiana, acted as leader; H. H. Aderhold, Marathon Corporation, Menasha, Wisconsin, was the expert. The recorder was H. L. Baughman, Container Corporation of America, Circleville, Ohio. (*Comment on questions presented before this conference must be deferred, since recordings were not available as this material goes to press.*)

These round table conferences met with favorable response from all who attended them. The varying opinions expressed and the discussion of questions presented proved both interesting and helpful.

◆

COMING EVENTS

Dec. 1-5.—Annual meeting of The American Society of Mechanical Engineers, Atlantic City, New Jersey.

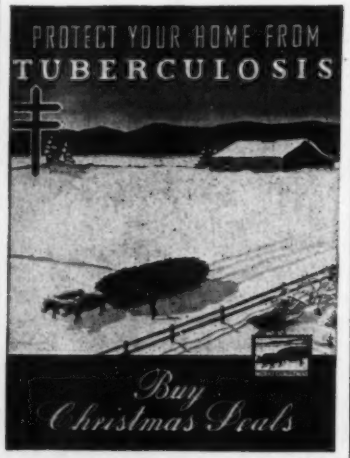
Dec. 1-6—Twenty-first Exposition of Chemical Industries, Grand Central Palace, New York City.

Dec. 5-6—Fall convention of the Pacific Coast Division of The American Pulp and Paper Mill Superintendents Association, New Washington Hotel, Seattle.

STATED MEETINGS

Chicago Professional Paper Group meets the third Monday of each month at the Chicago Bar Association, Chicago, Illinois (except July and August).

Good Health is the greatest gift of all



during the 41st Annual Christmas Seal Sale
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CONTROL...Yes

But HOW EFFICIENT?

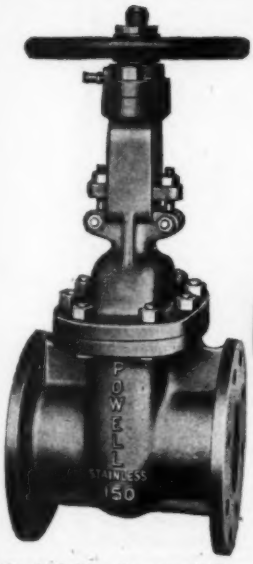

Fig. 2453-G — New, standard 150-pound Stainless Steel Gate Valve with outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc.

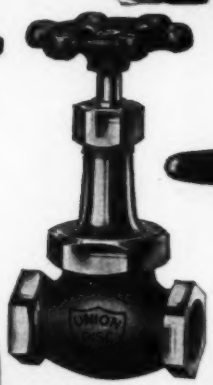

Fig. 150—150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

Fig. 1793—Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", incl. Has outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

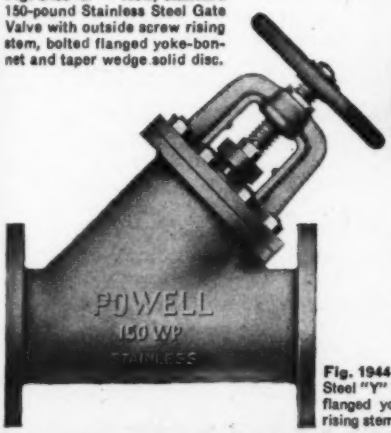

Fig. 1944—Large size 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem. Sizes 2½" to 12", inclusive.

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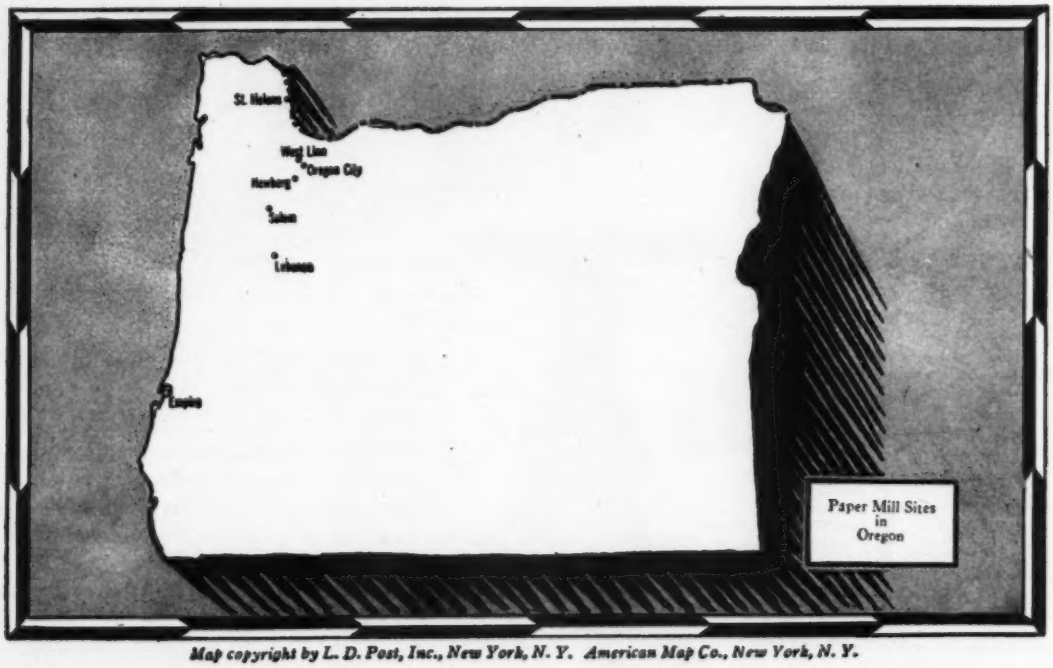

Map copyright by L. D. Post, Inc., New York, N. Y. American Map Co., New York, N. Y.

HIGHLIGHTS: Oregon has made fast progress in pulp manufacture, especially. As recently as 1930 its production was listed in the U. S. Census reports only under the heading "All Other States." By 1936, it had risen to sixth in rank. As a papermaking State it ranks sixteenth — producing over 310,000 tons per annum.

Products include newsprint, mimeo, sulphite bond, greaseproof, glassine, bristol, kraft, fruit wraps, waxed paper, wrapping paper and insulating board.

Equipment includes 21 Fourdriniers and one cylinder machine, 82 wood grinders, 23 sulphite and 4 sulphate digestors.

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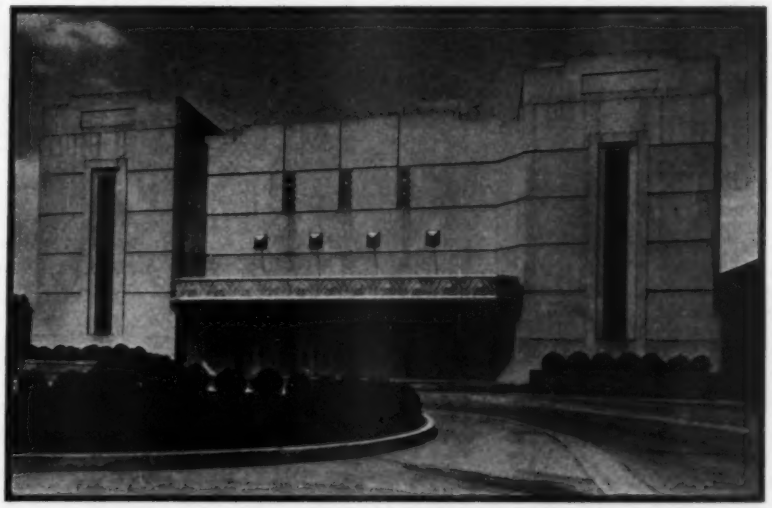
Technical Men and Superintendents Meet Jointly in Asheville

▶▶▶ A JOINT MEETING of the Technical Association of the Pulp and Paper Industry and two divisions of the American Pulp and Paper Mill Superintendents Association was held October 9-11 in Asheville (N. C.), "In the Land of the Sky." Sponsors of the meeting were the Alkaline Pulping Committee and the Chemical Products Committee of TAPPI and the Southern and Southeastern Divisions of the Superintendents Association.

All formal sessions were centered in the Asheville Municipal Auditorium. This building is located in the downtown section of Asheville, immediately adjacent to the George Vanderbilt Hotel, and only a stone's throw from the Battery Park Hotel. Built in 1940, it has a seating capacity of 1,906 on the main floor, the location of all TAPPI sessions. The banquet-exhibition hall (132 feet by 100 feet), located below the main floor, was used by the Superintendents for their formal sessions.

Luncheons were served on the first and third days of the meeting at both the George Vanderbilt Hotel and the Battery Park Hotel because of the more than 500 members of the two respective Associations and their guests who were present for the sessions. Luncheon on the second day of the meeting was served at the modern cafeteria of the Champion Paper and Fibre Company (Canton).

The local committees which had the burden of planning the meeting and executing the plans included a general committee composed of the following: W. D. Harrison, assistant general manager, Ecusta Paper Corporation, as chairman; F. W. Doutt, chief chemist, Champion Paper and Fibre Company, as co-chairman, and Raymond F. Bennett, general superintendent, Ecusta Paper Corporation (president of the American Pulp and Paper Mill Superintendents Association), W. P. Lawrence, research chemical engineer, Champion Paper and Fibre Company (chairman of Chemical Products Committee of TAPPI), and L. M. Bauer, production supervisor, Ecusta Paper Corporation. A ladies committee of 28 was headed by Mrs. L. M. Bauer as chairman and Mrs. Harold Hansen as co-chairman.



Asheville Municipal Auditorium where Technical Men and Superintendents met in joint sessions

Chemical Products Developments

The meeting was opened in joint session shortly before 10:00 a. m. on October 9 by Ward Harrison, who called upon the Rev. B. W. Thompson, First Baptist Church of Brevard (N. C.), to give the invocation.

Mr. Harrison then introduced Clarence E. Morgan, mayor of Asheville, who welcomed officially all delegates and briefly described some of the points of scenic interest in the region, including the Biltmore Estate, Pisgah National Forest, Great Smoky Mountains National Park, and Mount Mitchell—the highest peak east of the Rocky Mountains.

Mr. Harrison then adjourned the opening meeting and asked for immediate reconvening of delegates in two separate sessions; namely, TAPPI Chemical Products Committee session, and Superintendents Association session.

The TAPPI Chemical Products Committee with W. P. Lawrence as chairman not only sponsored the TAPPI program for the morning session but the afternoon session of the first day as well. The program for the two sessions included the presentation of nine papers. One of them, Extractive Material from Southern Pine, by C. C. Porter, Southland Paper Mills, was presented by title. Three of the remaining papers were presented in abridged form by Dr. H. K. Benson, of the University of Washington.

One of the three papers presented by Dr. Benson was a joint contribution by Nevin K. Heister, J. L. McCarthy, and Dr. Benson on The Separation of Lignin Sulphonic Acid from Sulphite Waste Liquor by Batch Dialysis.

In this paper is described a procedure by means of which calcium lignin sulphonates can be prepared in high purity and in substantial yield by direct dialysis of sulphite waste liquors. Other water soluble salts, or the free acids, may be secured by use of cation exchange resins. By these procedures purified lignin sulphonic acids and their salts may be prepared readily in amounts sufficient to permit the substances to be tested for various utilization applications. Preliminary values for specific gravity, viscosity and surface tension are recorded.

A joint paper by Hilda S. Daniels and Joseph L. McCarthy, University of Washington, entitled The Butyric Acid Fermentation of Sulphite Waste Liquor, was another one of the three papers reported on by Dr. Benson. This paper treats of a preliminary investigation on the fermentation of sulphite waste liquor sugars to butyric acid by *Clostridium polyfermenticum*. Cultural conditions are defined. Batch fermentation of stream stripped and

neutralized calcium base sulphite waste liquor medium diluted with an equal amount of water proceeds readily and removes about seventy-five per cent of the total initial reducing substances and converts about one-half of these to butyric acid in about 72 hours. Continuous fermentation of diluted calcium base sulphite waste liquor gives similar results but in about 10 hours. Undiluted sodium base sulphite waste liquor media is fermented.

The last of the three papers briefed by Dr. Benson was a paper by himself on the subject, Products from Pulp and Pulpwood on the Pacific Coast. This paper describes the production of total solids obtained by spray drying calcium base waste sulphite liquor by Rayonier, Inc., Shelton, Washington. This company is preparing to produce a liquid of 40-50 per cent solids from ammonium base sulphite waste liquor by vacuum evaporation for commercial marketing. It will be available before the end of 1947.

Another chemical product now manufactured on the Pacific Coast is ethyl alcohol. It is manufactured from calcium base sulphite waste liquor by the Puget Sound Pulp and Timber Co., Bellingham, Washington. The capacity of the alcohol plant is in excess of 2,000,000 gallons of 190 deg. proof alcohol per year. Construction is under way to produce concentrated liquid by vacuum evaporation and solids by spray drying to the extent of 20 tons per day of dry solids. These products are obtained from the effluent of the alcohol plant and are therefore largely free of carbohydrates.

Five products are made by Weyerhaeuser Timber Company, Longview, Washington, from Douglas fir bark. They are marketed under the general trade name of Silvacon. (The capacity of the plant is 75,000 pounds daily.) The products are finding application in the extension of phenolic resin and protein adhesives, in dusting compounds and as mulches and in soil conditioning.

The Pacific Lumber Company, Scotia, California, also manufactures bark fibers and bark dust from redwood bark under the trade name of Palco products, which are finding extensive application as textiles, oil filters, battery separators, and the like. The bark dust is used in soil conditioning.

Other papers on the program of the TAPPI Chemical Products Committee Sessions were: Seasonal and Geographical Variations in Tall Oil Composition, by W. H. Jennings, Camp Manufacturing Company; Progress Report on A.S.T.M. Standards of Analysis for Tall Oil, by Paul R. Wiley, West Virginia Pulp and Paper Company; The Recovery of Crude Para Cymene, by John G. Lewis, Rayonier, Inc.; Chemical Uses of Sulphate Turpentine, by P. O. Powers, Battelle Memorial Institute; and Utilization of Scrub Oak, by H. N. Calderwood and W. J. Nolan, University of Florida Experiment Station (reported on by Mr. Nolan).

Mr. Nolan made reference to a project that was started about three and one-half years ago to extract tannin from scrub oak bark; said that scrub oak is crowding out the pine in Florida; mentioned that scrub oak bark is difficult to remove from the wood; related that scrub oak trees average four to five inches in diameter; and added that bark can be separated fairly readily by air flotation from wood if hogged immediately after felling. The pulping experiments on scrub oak, said Mr. Nolan, probably will start about the first of the year (1948).

Lubrication Pointers for Paper Machine Bearings

The Superintendents Association program for the first day consisted of a morning and an afternoon session just as did the TAPPI program. The morning session was given over to the presentation of four papers; the afternoon, to a symposium on Southern Kraft Stock Preparation.

The first of the four papers of the morning session was presented by H. C. Roane, assistant division manager, Bowser, Inc. His subject was Care of Antifriction Bearings on High Speed Paper Machines. Mr. Roane stressed nine points that should be given consideration in setting up a program for the care of antifriction bearings on high speed paper machines. These points follow:

1. Use the highest quality oil which your supplier has to offer for the particular application involved. Cheap oils have no place in the circulating system of a high speed paper machine employing the use of antifriction bearings. Their use will most assuredly lead to trouble.

2. Maintain a liberal flow of oil through the bearings at all times when the machine is in operation. The amount of oil required for the actual lubrication of the bearing is relatively small but the amount of oil required to maintain a clean bearing and bearing housing is an entirely different matter.

3. The oil, as it reaches the bearings, should be absolutely free of moisture. Adequate precipitation time to allow separation of all free moisture from the oil is of utmost importance.

4. Make at least a monthly check on the general physical characteristics of the oil.

5. If the oil going to the bearings is at a temperature of 140 Fahr. or higher, additional cooling facilities should be provided. No appreciable cooling of the oil in the precipitation tank is desirable because we get better precipitation at the higher temperatures.

6. Spot check general condition of bearings periodically by removing housing covers from a number of bearings. Lucite windows in the housing covers would be helpful.

7. At the first signs of carbon build-up on bearing parts or deposits in bearing housings take immediate steps to reduce it by: (a) Check physical characteristics of oil, (b) increase rate of oil flow through bearings if possible, (c) check with oil company representative regarding possibility of adding a detergent to the oil to facilitate removal of the deposits.

8. Remove damaged bearings from system immediately upon detection. In a case where the load area of the outer race has started flaking and the rollers and inner race are still in good condition, the bearing can be continued in service by turning the outer race 180 degrees.

9. Drain oil periodically and thoroughly clean system to remove accumulated sludge and precipitated foreign material. For the average installation this should be done about once a year.

The next paper, entitled Improvements in Paper Machinery, was given by Charles Spalding, sales engineer, Beloit Iron Works. The presentation consisted of showing a well-selected group of lantern slides and discussing extemporaneously the subject of each of them.

Paper Drying Factors Discussed

The third paper of the session was on the Drying of Paper. It was presented by G. H. Young, vice president and chief engineer, Midwest-Fulton Machine Co.

Mr. Young confined his remarks to a discussion of what he terms the "Big Three" factors influencing drying; namely, moisture content, steam pressure, and surface contact.

A few of the highlights of Mr. Young's paper follow:

"Roughly, a sheet of 2 per cent less moisture content will increase the capacity of dryers about 9 per cent. (The difference between 74 per cent moisture and 68 per cent is equivalent to more than 34 per cent in production which a given set of dryers can dry, other factors being equal.)"

"Economically, it is better to remove the water at the presses than evaporate it by the dryers. It costs

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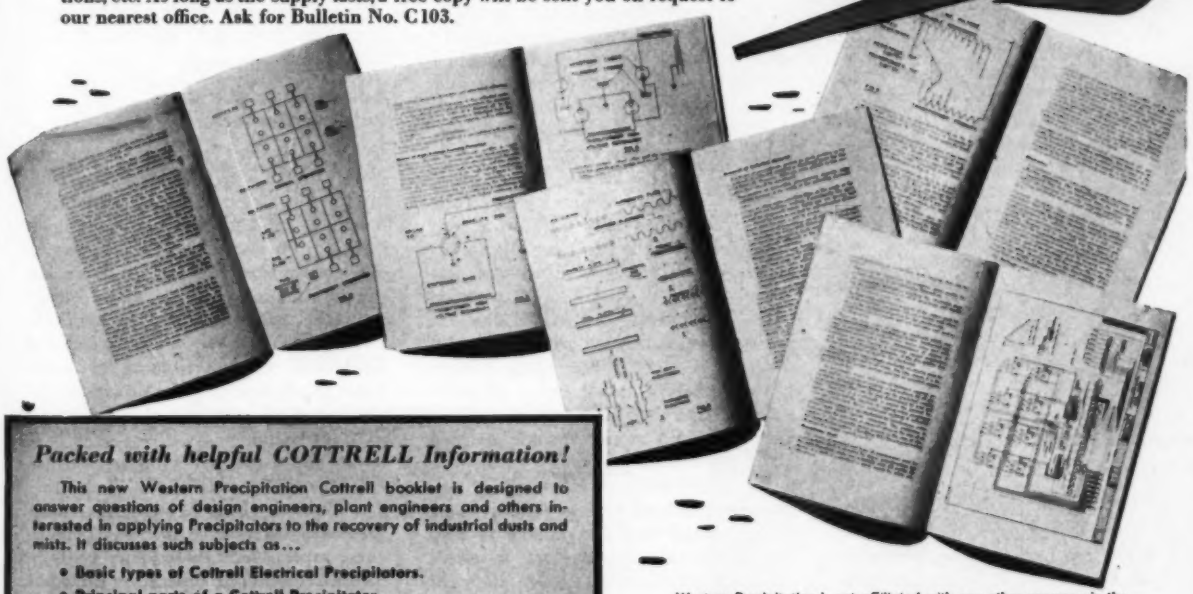

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Western Precipitation is not affiliated with any other company in the field of electrical precipitation except its wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. Whether you are now contemplating the installation of a Cottrell Electrical Precipitator, or may be interested in such an installation at a future date, we can and will serve you in any part of the United States or other countries.

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from 10 to 15 times more to remove the water by heating on the dryers."

"The final moisture content has a decided influence on the drying rate, far out of proportion to the small amount of water removed because the final moisture is removed at a drastically reduced drying rate as compared with the over-all drying rate on the machine."

"Steam pressure is the greatest single variable affecting the drying rate."

"Fortunately for the papermaker, the temperature of saturated steam follows well defined laws and for every pressure there is a definite corresponding temperature."

"Some paper machines operate at dryer pressures as low as 10 deg. vacuum and others as high as 125 pounds gauge, and pressures as high as 160 pounds are now being considered."

"Surface contact refers to the closeness with which the sheet is held against the surface of a dryer shell."

"Dirty dryers prevent the sheet making good contact with the metal dryer. Doctors pay big dividends by keeping the dryer clean and polished. Dirty dryers at the wet end are particularly bad and cut down the drying rate, because heat will flow into a wet sheet more readily than when dry."

"Surface contact can be helped by keeping the draws tight; this is especially true on board machines or on any machine not equipped with dryer felts. Slack draws can account readily for a 10 per cent drop-off in drying capacity. Dryer felts have a direct influence on surface contact. Proper control of felt tension is of prime importance."

How Industrial Relations Program Promotes Economical Operation

The concluding paper of the session was given by L. W. Ross, personnel analyst, Union Bag & Paper Corporation. His subject was The Superintendent in Industrial Relations.

Early in his remarks, Mr. Ross took up the development of the industrial relations staff. In this connection, he related how the maintenance staff, technical services, office and accounting services, and finally the industrial relations staff have come into being as a result of the growing complexities of mill operation. Mr. Ross referred to these staff functions as an extension of the superintendent's responsibility. While they are a service to him, they do not relieve him of ultimate responsibility for his part in the work, commented Mr. Ross.

Mr. Ross next proceeded to discuss the organization of industrial relations functions. He brought up for consideration such departments or services as employment records, training, safety, first-aid, transfers, plant protection, personnel research, insurance, etc.

Mr. Ross continued, "It is easy to see whether you are a supervisor in a plant with a full staff of industrial relations specialists or whether you have to handle completely some of these functions yourself; our purposes are the same."

Six specific ways in which an industrial relations staff helps promote economical operations were cited by Mr. Ross in his concluding remarks. They are:

1. *Good employee morale*, with its consequent beneficial effect on our choice of better workers. We want the reputation of being a good company to work for, thus enabling us to attract the best people to our job openings.

2. *Lower turnover*, which in turn reflects savings in training costs, fewer losses in production, and lower unemployment compensation costs.

3. *Better quality production* partly as a result of a stable and satisfied working force properly directed and trained by supervisors who are not subjected to too many interruptions.

4. *Higher production* at lower unit cost by the same token. While many elements, some mechanical, some technical, enter into this goal, it is also axiomatic that the more capable workmen can perform better and with less waste.

5. *Promotion from within* and yet with due regard to seniority and qualifications is much more easily accomplished where a stable group of well-selected and well-trained men have been attracted to and become satisfied with the company.

6. *Uniformity in procedures* affecting personnel actions results where an organized staff is available to help the production supervisors. In effect they constitute an executive staff for carrying out company policy, assuring this uniformity, and at the same time preventing discrimination by the impartiality of the procedures. This tends to erase one of the commonest causes of discontent among workers.

The panel members of the Symposium on Southern Kraft Stock Preparation were: R. F. Vokes, Dilts Machine Works (moderator); G. A. Hermann, The Hermann Manufacturing Company; Dwight Jones, E. D. Jones & Sons Co.; T. Agronin, Shartle Brothers Machine Company; Douglas G. Sutherland, Sutherland Refining Corporation.

Mimeographed copies of questions relating to the Sutherland refiner and to Shartle-Dilts stock preparation systems and equipment, as well as to the general subject of stock preparation equipment, were made available to all delegates present in the session as an aid to pertinent discussion.

Mills of Champion and Ecusta Visited

The morning of October 10, the second day of the meeting, was given over to a visit to the mill of the Champion Paper & Fibre Company, Canton (N. C.); the afternoon of the same day similarly to a visit to the mill of the Ecusta Paper Corporation, Pisgah Forest (N. C.). Specially-chartered buses transported most of the visitors to both Canton and Pisgah Forest and returned them to Asheville for the evening. Some few of the visitors used private cars to make the trip.

At both mills, the visitors were arranged into small groups for convenience in handling, and then each group in charge of a well-qualified guide was shown numerous details of mill operation.

The Champion operation at Canton dates back to 1907; that of Ecusta at Pisgah Forest only to 1939.

Advances in Alkaline Pulping Procedure

The Alkaline Pulping Committee with K. G. Chesley as chairman conducted the two TAPPI sessions, a morning meeting and an afternoon meeting, on the third and last day of the convention. In addition to the presentation of eight papers, a round table discussion followed each of the two sessions. The morning round table was on the reducing of sewer losses in alkaline pulping processes; the afternoon, on reducing chemical losses in stack gases.

Of the eight papers presented before these two sessions, T. T. Collins, Jr., Thilmany Pulp & Paper Company, presented three of them. The titles of these papers were: Pilot Plant Study of a Multiclone Unit Operating on Stack Gases from a Lime Kiln, Use of the Venturi-Scrubber on Sulphate Recovery Furnace Stack Gases (a joint paper by T. T. Collins, Jr., C. R. Seaborne, and A. W. Anthony, Jr.), and TAPPI Survey of the Sampling Methods Used to Determine Chemical Losses from Sulphate and Soda Recovery Furnaces.

In the first of these papers, Mr. Collins stated that the results of the pilot plant tests of a Multiclone unit for reducing the dust losses in the stack gases from a lime kiln indicates an efficiency of lime dust removal of approximately 70 per cent for a full-scale unit. In cases where it is not desirable to cool the lime kiln gases, as would be done in a wet scrubber or with stack sprays, he commented, the Multiclone unit should reduce the

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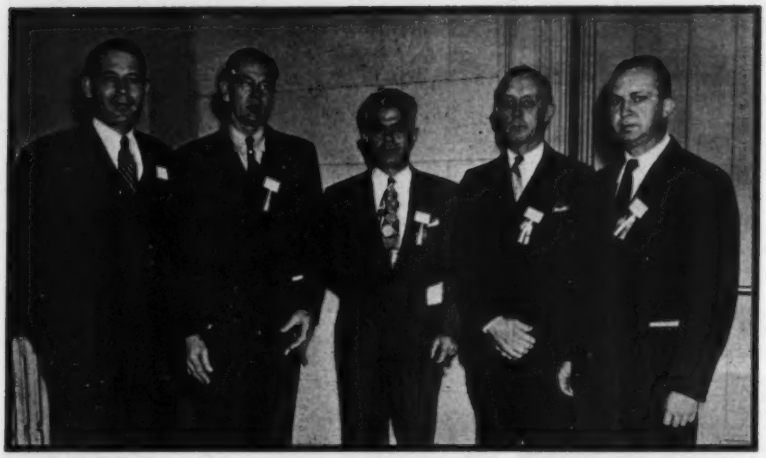


Among those who helped to make the meeting successful were: (L to R) K. G. Chesley, chairman of Alkaline Pulping Committee of TAPPI (director of research, Crossett Lumber Co., Crossett, Ark.); Fred V. Doutt, co-chairman of general committee (chief chemist, Champion Paper & Fibre Co., Canton, N. C.); W. F. Gillespie, president of TAPPI (technical director, Gaylord Container Corp., Bogalusa, La.); Raymond F. Bennett, president of American Pulp and Paper Mill Superintendents Association(general superintendent, Ecusta Paper Corp., Pisgah Forest, N. C.); and Ward D. Harrison, chairman of general committee (assistant manager, Ecusta Paper Corp., Pisgah Forest, N. C.)

nuisance of lime dust around the pulp mill.

The second paper was presented as a progress report of initial tests of the world's first large-scale Venturi Scrubber which has been installed at the Thilmany Pulp & Paper Company, at Kaukauna, Wisconsin. Mr. Collins stated that the efficiency of removal of sodium (compounds) from the stack gases, as anticipated from pilot plant data, is approximately 88 to 90 per cent for normal operation of this unit. He also related that the scrubbing solution is continually recirculated and maintained very nearly saturated with the sodium salts by a continual bleed-off of liquor to the black liquor system.

Mr. Collins, in his third paper, reported on the circulation of a questionnaire among kraft and soda mills and summarized procedures, revealed from the information so obtained, used for determining the chemical losses from recovery. He also described methods of chemical analysis of the dust and gave some quantitative data on stack losses, dust loadings, and composition of the recovery furnace fume in the various mills.

Two papers were presented before the morning session by L. D. McGlothlin, kraft mill superintendent, Crown-Zellerbach Corporation (Camas, Wash.). One of these papers was entitled Time Cycle Pressure Control for Rotary Digesters; the other, Consistency Control.

Mr. McGlothlin, in presenting the first of these two papers, stated that a short cooking cycle due to high liquor concentration has made accurate control imperative; that the low volume of steam per cook, due to the small size of the rotary vessel and to the low volume of liquor to be heated, has imposed close tolerances as to flow control on the instrument, and that the mechanics of fitting a stationary indicator to a rotary pressure vessel have proved more difficult than anticipated.

"The present system," said Mr. McGlothlin, "utilizes a time cycle pressure control with a continuous resetting feature on the pressure controller."

Briefing the paper of Mr. McGlothlin on Consistency Control, it stated in part: One of the first prerequisites of good, efficient washing on vacuum washers is the maintenance of uniform sheet or cake thicknesses on the drum filters—this can only be accomplished with good pumping equipment and consistency control. For best results, a pump with a large diameter impeller and slow speed motor, preferably variable speed, should be used to pump only the desired amount of stock without overflow back to the blow tank or without valve throttling. The stock coming from the digesters usually has a consistency of about 15 per cent and is very free. It is the practice to add weak liquor to the stock at this stage to reduce the consistency so that it may be handled properly by the pumps and delivered to the washers. Prior to pumping, it is necessary to provide consistency control which will be highly sensitive to change and will operate automatically and efficiently to maintain a uniform predetermined consistency in the stock preparatory to its being pumped to the washers.

The paper also describes a device for effectively controlling the consistency. The device includes a closed tank with inlet at the bottom and outlet at the top through which the stock flows to the pump. The black liquor for dilution is delivered into the tank through several inlet branch pipes from a main header.

A series of baffles extends horizontally within the tank. Also, centrally located within the tank is a vertical shaft equipped with paddle blades. The shaft extends upward through the top of the tank.

Electric power for operating the motor to rotate the paddles in the tank is delivered through a thermocouple watt meter which serves to convert wattage to milli-voltage.

The controller being totally-enclosed and under pressure cannot add air to the stock, and the movement of the paddles, being slow, will not whip up foam from any air that already may be in the stock.

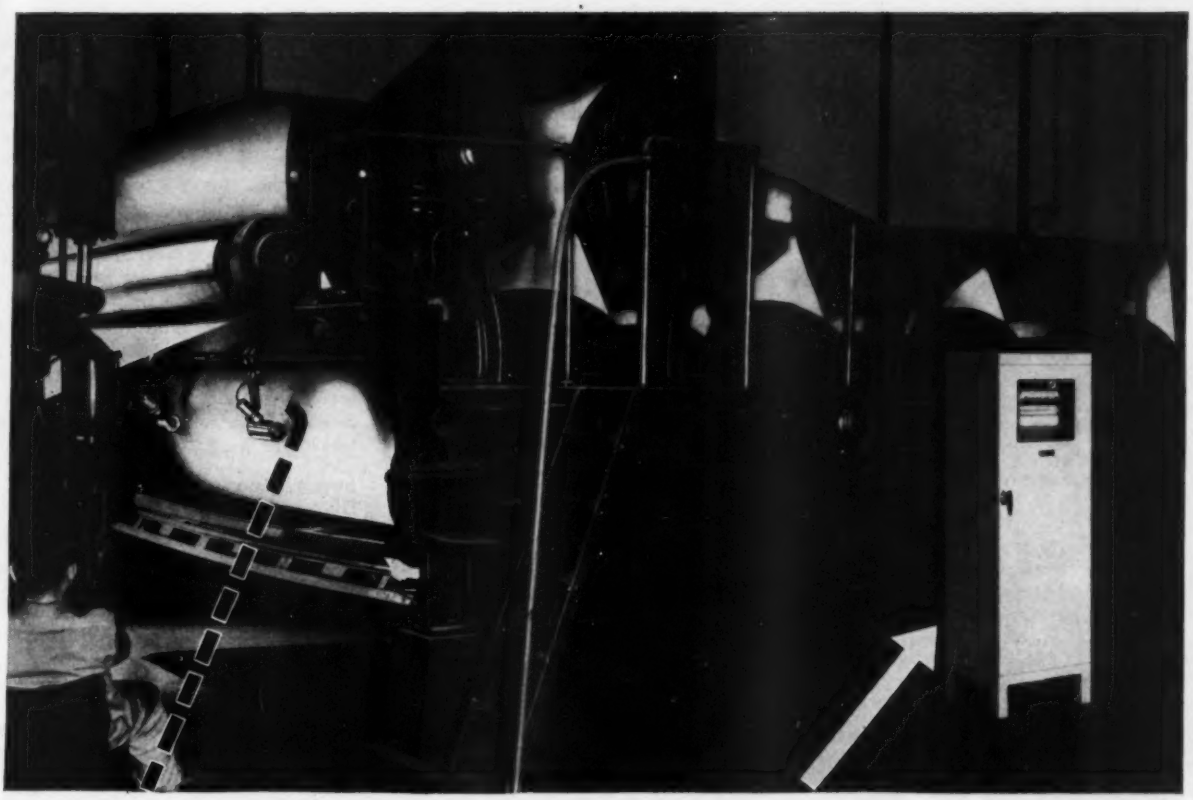
Further mechanical advantages of the tank in the line are: first, it will act as a trap for tramp iron which can be removed at periodic shutdowns; and second, the tank being totally-enclosed, may be kept clean easily and cannot cause overflow.

Other papers presented before the sessions of the Alkaline Pulping Committee were: Methods for the Determination of the Oxygen Demand of Kraft Mill Wastes, by H. W. Gehm and William Moggio, National Council for Stream Improvement; Survey of Pulp Mill Sewer Sampling and Analytical Methods, by R. R. Fuller (Member of Alkaline Pulping Committee), Gulf States Paper Corporation; and Operating Experiences with Cottrell Precipitators on Sulphate Recovery Gases, by L. M. Roberts, C. E. Beaver, and W. H. Blessing, Research Corporation.

The joint paper by Roberts, Beaver, and Blessing on Cottrell Precipitators was presented by Mr. Roberts. In part, he said:

"The commercial application of electrical precipitation received its greatest impetus from the work of Dr. Frederick G. Cottrell around 1905.

"In the operation of an electrical precipitator, a high voltage unidirectional current flow is set up between two spaced sets of electrodes through which the gas containing the suspended matter is passed. One group of these electrodes are usually filamentary such as wires, rods, etc., and are known as the discharge electrodes. The other set, commonly known as the collecting electrodes, have large or extended surfaces on which most of the suspended matter collects; the relationship of surfaces being in the ratio of 16 to 1. The high voltage discharge



The Detector Roll (pictured above) measures the moisture content of the sheet immediately under it. By using up to six rolls, a complete traverse can be made by a simple switching operation. Thus wet streaks can be detected before it is too late.

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Finishing operations will also be speeded up and improved because the *Moist-o-Graph* assures a constant-moisture sheet to the calender, coaters, super-calender.

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between these two groups of electrode ionizes the gas and liberates a large supply of gas ions. These ions attach themselves to the suspended particles present in the gas between the electrodes, thereby charging the particles, after which they are attracted to the electrode of opposite electrical sign. In order to maintain the highest possible voltage, the discharge electrodes are usually of negative polarity and the collecting electrode of positive polarity.

"A precipitator installation might be segregated into two parts. First, the precipitator itself in which are grouped the electrodes and in which the gas is treated. Second, the electrical equipment for generating and controlling the high-voltage current required.

"The application of Cottrell Electrical Precipitators to recovery furnace gas cleaning involves the handling of the combustion gases after they have been cooled in the spray towers or disc evaporators.

"In general, this problem resolves itself into cleaning a gas containing certain acidic constituents which, if condensed by cooling, are extremely corrosive to steel. It involves removing solids which, since they originate in a high temperature volatilization process, are extremely fine as regards particle size and which could properly be classified as a fume. The dust as collected is extremely light, weighing about 9 pounds per cu. ft. when freshly precipitated and 30 pounds when packed. The precipitated dust is readily soluble in the condensate, which, when saturated, forms hard crystalline masses which are removed only with great difficulty from any metallic surface.

"In order to effectively handle this problem, it was concluded that these particles could be precipitated in a satisfactory manner if conditions were controlled so that the gases were treated at a temperature sufficiently above the dew point temperature so that condensation did not occur. Under these conditions, the material would be precipitated in the dry, easily handled state. Inasmuch as this method involved handling the gas in a relatively dry state, it would not be necessary to take recourse to alloy materials for corrosion resistance.

"The first commercial installation involving this type and construction of precipitator was initially operated in June, 1940. Since this date a total of 28 installations, each comprising from one to five precipitators, have been built or are under construction or contract. These installations have a total contract volume rating of about 6,000,000 cfm., which is roughly equivalent to a production of about 13,000 tons of pulp per day.

"In order that a factual summary of . . . operating experiences of plant operators could be prepared, . . . questionnaires were sent to plants at which the precipitators were in service and the initial tests completed.

"The questions covered information on pulp tonnage, operating temperatures, amount of precipitate, analyses of dust, operating outages and availability of precipitator, maintenance and operating information.

"With the exception of . . . (one mill), the range of temperatures at the inlet and after spray cooler or disc evaporators is from 260 to 320 Fahr. The temperature (of the one mill indicated as an exception) has been about 395 Fahr., as no spray coolers or disc evaporators are utilized. It is interesting to note that the efficiency at this plant is lower than the rest. This lowering of the efficiency with temperatures in excess of 325 Fahr. corroborates the pilot plant experience, for it was observed in those tests that the material becomes exceedingly light and fluffy at the higher temperatures. To operate at the higher temperatures, lower velocities of treatment are required.

"The outlet temperatures range from 250 to 320 Fahr., resulting in a temperature drop of from 10 to 75 Fahr. on these installations. In the lower inlet temperature group the range is 5 to 25 Fahr.

"The analyses of the principal chemical compounds present in the material precipitated and removed from the precipitator hoppers show considerable variation. This variation in composition reflects to a large extent the operating variables occurring from plant to plant.

"Of interest to operators is the presence of chlorides in some of the precipitates. Their presence, of course, complicates the corrosion problem for not only must the equipment be protected from the corrosive activities of sulphur compounds but also from that caused by chlorine combinations.

"In the questionnaire, information on the amount of dust precipitated was requested.

"The figures reported are based on average monthly returns and represent, therefore, the precipitator operation through all types of operation. In general, the returns show recoveries of 88 to 145 pounds per ton of pulp, the average being 118 pounds. Based on the average rate and a precipitator availability of 95 per cent, the yearly return from a 250-ton mill operating 350 days per year would be 4900 tons.

"The successful handling of this material from the precipitator presupposes that it can be assimilated into the recovery system. In all cases, the dust is now dissolved in black liquor and returned to the black liquor flow in the recovery plant. Apparently no major troubles are encountered with this method for no complaints were registered in the questionnaire replies.

"One of the questions asked the operators was what percentage of the time was the precipitator available for operation?

"The records indicate availability ranging from 94 to 98 per cent. . . . In view of the severe service, from a corrosion standpoint, which the equipment has to withstand, this record speaks for itself."

Superintendents Elect Divisional Officers

The Superintendents concluded their program of papers with the morning session of the third day of the convention. Likewise, at this session, officers for both the Southern division and the Southeastern Division of the Superintendents Association were elected. The results of the elections follow:

Southern Division—Frank Jensen, Hollingsworth & Whitney Company, chairman; Phil Hannan, Southern Advance Bag & Paper Company, first vice chairman; Andrew Downey, Florida Pulp & Paper Company, second vice chairman; Roland Wilbur, Southern Paperboard Company, third vice chairman.

Southeastern Division—Harry J. Kruse, Albemarle Paper Mfg. Company, chairman; Lee M. Bauer, Ecusta Paper Corporation, first vice chairman; Sidney Brown, National Container Corporation, second vice chairman.

The elections were followed with a Symposium on Paper Machine Clean-up with Frank S. McCall, assistant superintendent, mill technical department, Union Bag and Paper Corporation, as lead-off man.

The final feature was a talk by John Eversman, recreation director, Ecusta Paper Corporation, on The Value of a Recreation Program in Industrial Relations. Mr. Eversman also showed colored movies to illustrate some of the work being done at Ecusta under his direction.

All sessions of the Superintendents Association were presided over by Earle Hobaugh (St. Joe Paper Co.), and Harry Kruse (Albemarle Paper Mfg. Co.).

Some Pleasantries

Walter Glass, F. C. Huyck & Sons Company, the first evening of the convention, showed two very interesting movies. The first movie was a color

What? MACHINE FINISH PAPER FROM A CLAY COATED FELT!

An all-fiber sheet is always stronger than a sheet that contains clay or other non-fibrous filler. But it is often necessary to add such fillers to make the paper more opaque and to improve its printing qualities.

Mill superintendents sometimes find it difficult to get the clay distributed uniformly among the fibers of the web without clogging the meshes between the fibers of the felt. The felt soon becomes as slick and smooth as a sheet of enamel paper . . . water can't get through . . . machine speed must be reduced . . . more heat is needed at the driers.

Consult our representative about problems of this kind. With several hundred different types of Hamilton Felts at his command, he will recommend one that will do your work better, faster and at lower cost.

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film of Simonds Saw & Steel Company entitled Machine Knives in Industry.

The second movie was the work of Mr. Glass himself. It showed in detail the harvesting and transportation of pulpwood for the Georgetown (S. C.) mill of the International Paper Company. It also touched on equipment for and procedure followed in fighting forest fires.

Entertainment the second evening was under the direction of John Eversman of Ecusta with music by the Buccaneers and the Ecusta String Band. Preceding the entertainment, which proved highly enjoyable to everyone, was a picnic supper served cafeteria style.

The meeting closed with a banquet on the evening of October 11.

Homer H. Latimer, Director of Paper Manufacture, Champion Paper & Fibre Company, was toastmaster. Remarks were made by W. F. Gillespie, of Gaylord Container Corporation, as president of TAPPI; and by Raymond F. Bennett, of Ecusta Paper Corporation, as president of the American Pulp and Paper Mill Superintendents Association.

Mr. Gillespie referred to the passing of Worthen Brawn (whose office he is filling as president of TAPPI) as leaving a gap that cannot be completely filled. In highlighting TAPPI activities, he said, in part, that the present membership of approximately 3200 is scattered over 40 states, 6 Canadian provinces, 14 European countries, Mexico, Newfoundland, eight of the South American countries and in eight other countries scattered about the world; that the budget for TAPPI publications alone approximates $60,000, and that the strength of TAPPI is in its approximately 75 functioning committees.

He announced that TAPPI already has planned for five fall meetings next year—the third engineering conference at Buffalo (N. Y.); a fundamental research meeting at Madison (Wis.); a mechanical pulping meeting in Maine (Poland Spring); a testing committee meeting at Pittsburgh or Washington; and a plastics committee meeting, probably in Pittsburgh.

Mr. Gillespie expressed the hope that the Asheville meeting would develop a closer bond between TAPPI and the Superintendents, and thanked management, making specific reference to Mr. Strauss of Ecusta and Mr. Robertson of Champion for making such meetings possible.

Mr. Bennett referred to the meeting as marking a milestone in the Asheville area as it was the first joint meeting of operating men and technical men to be held there. He added that it was very gratifying to see the congenial mingling of the two groups which not so many years ago were referred to in the case of the superintendents "as rule-of-thumb papermakers," and in case of the technical men as "damn chemists."

Mr. Bennett also commented that "the operating man welcomes the technical man because he realizes that he cannot keep his mill abreast of competition and consequently in business without the new developments that can come only from research"—that the technical man welcomes the operating man because he realizes that there still is and probably always will be a certain amount of art in papermaking and no new development can be of any value until the operator actually puts it into practical operation."

Thanks also were extended by Mr. Bennett to Mr. Robertson and Mr. Strauss for their help and backing and to all others who worked to make the meeting a success.

An honorary membership in the American Pulp and Paper Mill Superintendents Association was presented during the banquet meeting to Reuben B. Robertson, president of the Champion Paper & Fibre Company and also president of the American Paper and Pulp Association. The presentation was made by Fred C. Boyce, widely and affectionately known as the "Father of the Superintendents Association."

Responsibilities of America in World Leadership

Mr. Robertson, introduced by Mr. Strauss, also presented the address of the evening. A few highlights from his address follow:

"America has, through the march of events, stepped into world leadership as the spokesman of democracy and its corrollary, private enterprise.

"This world leadership involved heavy responsibilities possibly unwanted, but nevertheless inescapable. Our nation, I believe, intends to be its 'brother's keeper' to the extent of taking on the probably thankless task of helping the starving people of Europe. If I correctly understand the sentiment in Washington, however, this help is going to be given in a realistic spirit.

"Sharing with Europe inevitably means heavier tax burdens and a greater diversion of funds from the expansion of free enterprise than would otherwise have been the case. The ideal of free enterprise is high production rate and low cost to the consumer and a higher standard of living for all. Heavy tax burdens interfere with the full and free development of the low costs we all desire.

"Our nation needs and must have the greatest possible economic strength and that is equally true whether we think in terms of defense or in terms of national progress. That calls for steadiness, foresight, efficiency, and team work, and above all a deep sense of the responsibility which rests on each and every one of us engaged in industry.

"Harvard's Sumner Schlichter gives us this comforting thought, 'In the U. S. A. there are three million two hundred thousand non-agricultural businesses. This large number is one of the most important facts in American life; 3,200,000 places where budgets are made, where innovations may be authorized, and experiments tried. No regimented economy can hope to compete in initiative and dynamic drive with an economy that has 3,200,000 centers of innovation.'

"Let's not go star gazing but handle to the best of our ability the job that has been assigned to us and is already in our hands.

"You and I, in our desire to achieve industrial success, have to give thought every day to the problems of human relations in industry. We must have team work between labor and management and that calls for sympathetic understanding — continuous appeasement by either party is neither effective nor wise. There must be a policy of give and take with neither party doing all the giving nor doing all the taking.

"In the Court of National Opinion, organized labor stands convicted in recent years of having done too much of the taking and too little of giving—with the inevitable result that legislative curbs were considered necessary, and those curbs were provided in the Taft-Hartley bill, the intent of which was, in my opinion, corrective, not punitive.

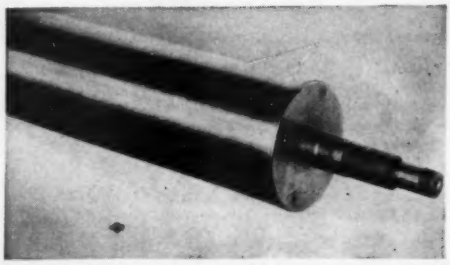
"Many of you have, no doubt, seen the recent survey conducted by one of our weekly magazines—wherein workers of organized labor were individually questioned about each one of the ten essential provisions of the Taft-Hartley bill without advising them that the provisions were actually incorporated in the act. With the exception of the closed shop provision, a great majority approved each and every one of these provisions as being fair and proper. Then they were asked whether or not they were in favor of the Taft-Hartley bill and the majority reported that they were against it. The editor's conclusion was that the workers of organized labor were in favor of the Taft-Hartley act but didn't know it.

YOU have an old paper machine roll . . .

YOUNGSTOWN has a special process . . .

INCO adds a specialized metal . . .

PUT 'EM ALL TOGETHER FOR NEW, TROUBLE-FREE LIFE!



MONEL-COVERED STEEL TUBE TABLE ROLL. Six-inch diameter by 157" face. Covered with ⅛" Monel sheet; then polished to a fine, smooth surface. A roll like this resists sagging and whipping. It insures against faulty web formation and reduces wear on Fourdrinier wires.

THIS SIZE PRESS RECEIVING DRYER is 4 ft. in diameter, has 118" face. Its ¼" Monel covering provides a smooth, dense surface which resists pitting and corrosion. *Photos courtesy of The Youngstown Welding & Engineering Co., Youngstown, Ohio.*

THESE ARE TYPICAL USES FOR MONEL-COVERED ROLLS

PAPER MACHINE
Dance Rolls
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Smoothing Press Rolls
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Paper Guide Rolls

FOURDRINIER
Table Rolls
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Wire Shaking Rolls
Wire Stretch Rolls

AND . . .
Asphalt Shingle Press Rolls
Board Machine Press Rolls
Breast Rolls for press part of Wall Board Machine
Cold Roll Waxing Machine Chilling Rolls
Fibre Mill Dryer Rolls
Wet Felt Rolls
Water Waxing Machine Paper Guide Rolls

Here's a cost-saving recipe that's worth sampling:

Take one of your old paper machine rolls . . . steel or cast iron . . . bronze, brass or aluminum . . . any diameter, any length . . . *. . . and send it to be covered with Monel*.*

"Pressure Welding" plays no favorites. This patented process developed by THE YOUNGSTOWN WELDING & ENGINEERING COMPANY, 3700 Oakwood Avenue, Youngstown, Ohio, bonds to your original core a tough shell of smooth, corrosion-resistant Monel.

That one step just about doubles the hardness of the roll surface over that of commonly used non-ferrous metals. Naturally, it gives you better resistance to wear and abrasion.

At the same time, it packs in plenty of resistance to corrosion. For Monel withstands acid and alkaline paper machine white waters. It resists stocks, sizes and souring solutions such as muriatic acid and sulfuric acid.

This means Monel surfaces stay smooth. They don't favor the accumulation of fibre, slime and pitch . . . don't cause wet paper sheets and sizes to stick. And where wettability is important—on press rolls, for example—Monel-covered rolls carry ample water to the nip for a free release of the sheet.

Another point: Monel has no tendency to react galvanically. So you can use Monel-covered rolls safely . . . even in contact with copper and bronze under corrosive conditions.

There's no better proof of all this than your own experience. Let YOUNGSTOWN WELDING & ENGINEERING refinish one of *your* old rolls with a durable "Pressure Welded" Monel cover.

*Reg. U.S. Pat. Off.

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"In our efforts to find the correct point of balance between caution and experiment, conservatism and change, we must make daily decisions. We would like to put new ideas into practice but we must keep a weather eye on the relations between capital investment and the returns on that investment.

"In the paper industry as a whole, demand still exceeds supply with a resultant sales market, and we are tempted to believe that this will continue on into the distant future. But the 'lodestar of the past' warns us that the demand can shrink at a terrific rate overnight, when a cloud of doubt appears on the horizon. We know, too, that the difference between a buyer's market and a seller's market may be but a single carload.

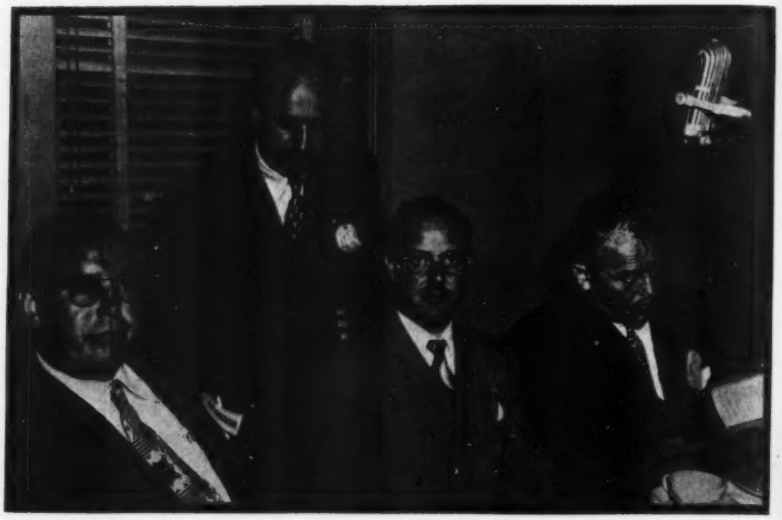
"In these days of a somewhat clouded future, my feeling is that it is best for the paper industry and likewise for all industry that we put some restraint on our enthusiasm for innovation and expansion and avoid venturing too far into new fields and unchartered seas. To my mind, the time is quite right for modernization and mechanization and improvement, where expenditures can be liquidated through savings in a relatively short time."

The ladies' program also was a full one. It included two trips—a trip to the Biltmore Estate and a trip to Biltmore Industries, the latter to view handicraft work and handwoven homespun; several special luncheons and a dinner, a card party, golf, bingo, and the picnic supper and entertainment previously mentioned.

◆

PAPER MILL MEN'S CLUB OF SO. CALIFORNIA HOLDS 13TH ANNUAL HI-JINKS

The thirteenth annual Hi-Jinks, high point of the social season of the Paper Mill Men's Club of southern California, was held at Lakewood Country Club, Long Beach, September 19.



Principals in the thirteenth annual Hi-Jinks of the Paper Mill Men's Club of Southern California were: (L to R) John D. Kirby, general Hi-Jinks chairman; L. A. Gardiner, vice chairman; Newbey Green, Paper Mill Men's Club president; and Gary Cann, who expressed the appreciation of the jobbers and wholesalers for the invitation to the party

The attendance of 341 mill men and guests was the largest on record. The party is given annually by the mill men for their guests and customers, the wholesale paper and twine merchants. A golf tournament was held in the afternoon, with 110 players teeing off. The many valuable prizes consisted mainly of golf apparel and equipment.

General chairman of the 1947 Hi-Jinks was John D. Kirby of Kirby Sales Company, assisted by vice chairman L. A. Gardiner of Nekoosa-Edwards Paper Company. Current officers of the club are: President—Newbey Green, of Willamette Paper Company; vice president—Jerry Madigan, of Johnson, Carvell & Murphy; secretary—Irvin E. Damon, of Northern Paper Mills; and treasurer—Jack Leiser, of Pioneer Wrapper Company.

CANADIAN ASSOCIATION AND INSTITUTE ANNOUNCE WOODLANDS PROMOTIONS

W. A. E. Pepler was named manager of the Woodlands Section of the Canadian Pulp and Paper Association and A. Koroleff was named director of woodlands research of the Pulp and Paper Research Institute of Canada in a joint statement issued recently by the two groups.

Mr. Pepler is manager of the Quebec Forest Industries at present and is also secretary-manager of the industry's Pulpwood Committee. He is a member of the Canadian Society of Forest Engineers, the Quebec Society of Forest Engineers, and the Quebec Forestry Association.

Mr. Koroleff has been forester-secretary and manager of the association's Woodlands Section for the past twenty years.

This is an OWEN PULPWOOD GRAPPLE •

To handle a *greater volume* of pulpwood in *less time* and at a *reduced cost,* some of the world's largest Pulp and Paper Mills have installed the Owen Grapple System.

Wouldn't it be wise to think in terms of your pulpwood handling problems today, in order that you may operate the more profitable "Owen Way" tomorrow?

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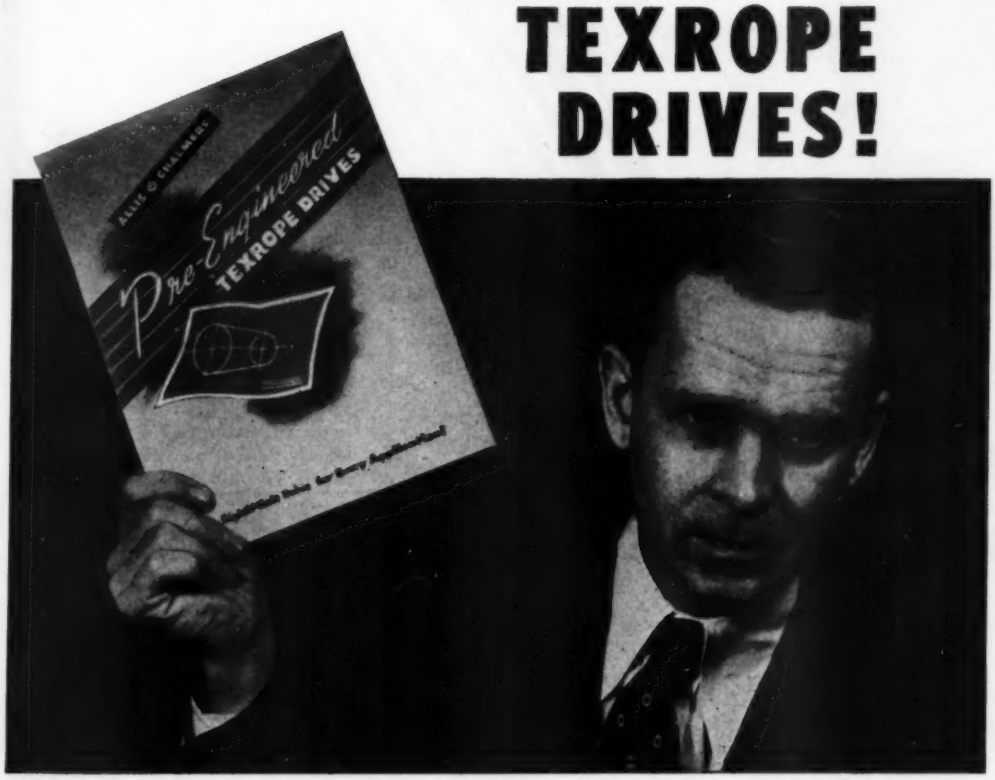

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Five Types — Sizes to suit every power transmission job.

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Exact variations in speed, stationery or motion control.

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Speed variations up to 375% at the turn of a crank.

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TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

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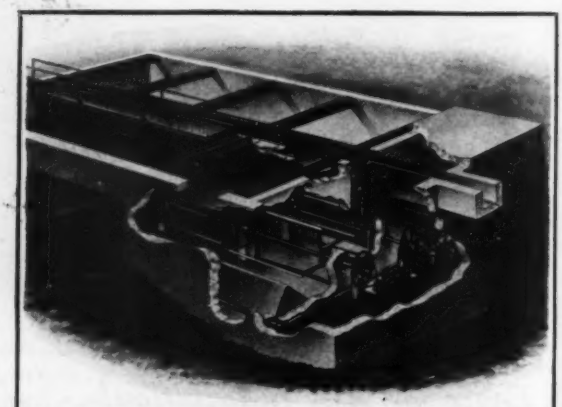
PERMUTIT White Water Reclaimer Saves Money—Permits Re-use of Water

Don't let paper and profits go down the drain! Reclaim those valuable pulp fibres and filler now lost in white water with a Permutit White Water Reclaimer. Turn waste into profit!

The Permutit White Water Reclaimer also permits *re-use* of the water after removal of fibres and filler. Where water is scarce, get the *maximum* use out of each drop. It saves you money!

Permutit equipment can serve you profitably. For full details write the Permutit Company, Dept. PI-11, 330 West 42nd St., New York 18, N. Y., or the Permutit Company of Canada, Ltd., Montreal.



PERMUTIT WHITE WATER RECLAIMER— filters white water *upward* through a suspended blanket of pulp fibre. Both fibre and filler are recovered, and valuable process water is recycled!

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TAPPI Fibrous Agricultural Residues Committee Meeting

Reported by
S. I. ARONOVSKY*

▸▸▸ PROBLEMS RELATING to the procurement, storage, preservation, and pulping of straw, and to the manufacture of pulp and paper products from straw were the subject of a two-day discussion at the fall meeting on fibrous agricultural residues held at the Alton Box Board Company, Alton, Illinois, under the auspices of the Fibrous Agricultural Residues Committee of the Technical Association of the Pulp and Paper Industry. Practically all of the strawboard mills were represented at this meeting. A number of paper mills and some of the allied industries also were represented. Practically everyone who came to this meeting stayed the full two days and enjoyed a very interesting technical program, as well as the generous hospitality provided by the Alton Box Board Company.

The meeting was opened on Thursday morning, October 23, by N. F. Wilson, local chairman and chief chemist of the Alton Box Board Company, in the conference room of this company. After self-introductions by all those present, Mr. Wilson introduced M. W. Swaim, first vice president and general manager of the Alton Box Board Company, who gave the welcoming address. Mr. Swaim pointed to the needs for technical control and supervision in the strawboard industry. He stressed the value of the exchange of technical information among the various strawboard mills and hoped that this was the first of a series of meetings wherein the personnel of the various strawboard mills would visit each other and discuss problems of mutual interest.

Mr. Wilson then turned the meeting over to Dr. S. I. Aronovsky who called on R. G. Macdonald, secretary of TAPPI. Mr. Macdonald stated that this was his fourth fall meeting this year and it appeared that the plan of having several sectional fall meetings rather than one large general meeting seemed to be working out satisfactorily. He also praised the fine co-operative spirit of the member mills and the industry which made such meetings as this possible. He pointed out that industry was bound to gain considerably from interchange of information and discussions which take place at such meetings.

(*) In charge Pulp and Paper Section, Agricultural Residues Division, Northern Regional Research Laboratory, Peoria, Ill.

Preservation of Stacked Straw

Dr. Aronovsky then called for the presentation of technical papers. The first paper, "Treatment for Prevention of Decay in Stacked Straw," by D. F. Stahl, Terre Haute Paper Company, Terre Haute, Indiana, and H. L. Smith, Dow Chemical Company, Midland, Michigan, was presented by Mr. Stahl. Mr. Stahl described the preliminary work carried out in the straw yard of the Terre Haute Paper Company with the use of sodium pentachlorphenate as the preservative. It was shown that the top tiers of a 400-ton rick treated with $80 to $100 worth of this chemical were preserved fairly well, resulting in only a negligible degree of rotting of this straw as compared with a control straw rick which was untreated. The treatment was confined to the top surface of the rick using the pentachlorphenate either in flake form or as a spray. About one pound of the chemical per seven square feet of surface area resulted in an acceptable degree of preservation.

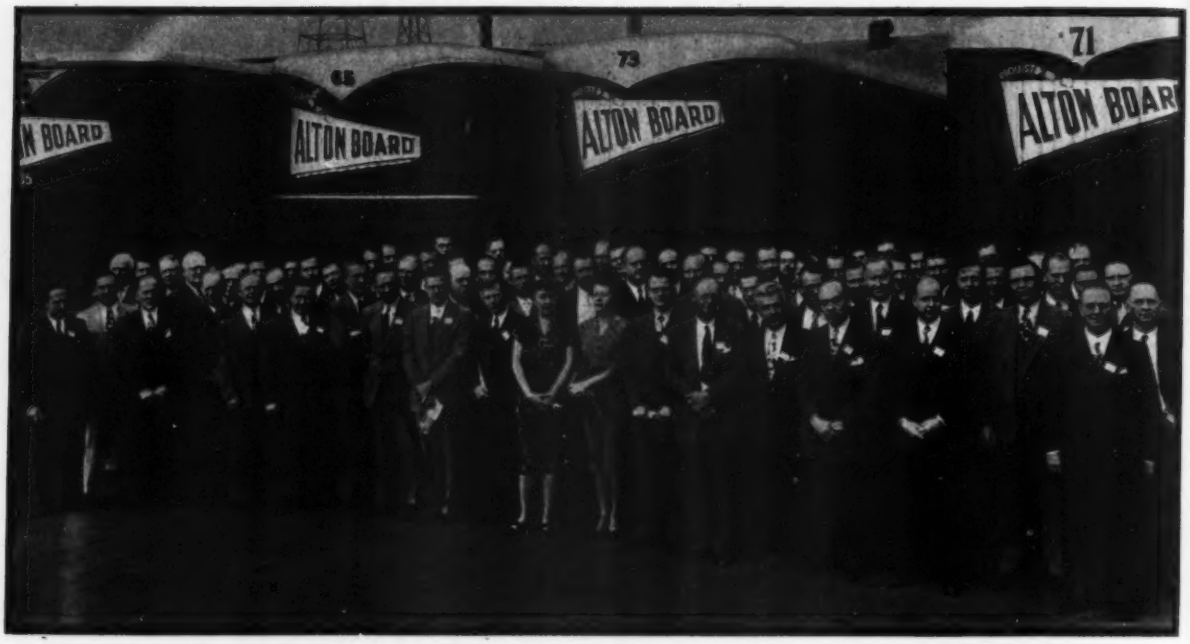
Detecting Moisture in Baled Straw

The next paper on the program, "Rapid Estimation of Moisture of Straw in Bales," by S. I. Aronovsky and H. M. Sutcliffe, Northern Regional Research Laboratory, Peoria, Illinois, was presented by Dr. Aronovsky. This work was carried out at the Northern Regional Laboratory on baled straw, using the Delmhorst moisture detector as the measuring instrument and oven-drying as a control check. The results indicated that this moisture detector is fairly accurate up to a moisture content in the straw of about 25 per cent. With straw containing more than 25 per cent moisture, the present model (RC) of the instrument was satisfactory only as a qualitative guide for determining relative degrees of wetness. The Delmhorst instrument is simple, easy to operate, compact and meets the requirements of the industry for rapidity of testing and portability for field work.

"Moisture Testing of Baled Straw by Electronic Methods," by N. F. Wilson, Alton Box Board Company, Alton, Illinois was presented by Mr. Wilson. In this paper Mr. Wilson showed simplified circuits illustrating the construction of typical electrical conductivity types of moisture meters. He discussed the suitability of these instruments for determining moisture and showed that, when properly calibrated, the electronic moisture meter has sufficient accuracy over the moisture range normally encountered to make it an extremely useful instrument for the straw purchaser.

Talk on Processing Apparatus Illustrated

After a brief recess R. G. Goodwin, Paper and Industrial Appliances, Inc., New York, gave a brief illustrated talk on the "Morley Continuous Process and Apparatus." In this process, straw is cooked in a hot caustic soda solution at atmospheric pressure. The apparatus consists essentially of four 24-inch tubes containing screw conveyors. The straw discharged from the first tube drops into the entrance of the second tube, and so forth. The straw defibered during the cooking process is washed in the fourth tube of the apparatus and is then ready for the jordans thus eliminating the present washing and beating processes. The yield is stated to be approximately 70 per cent based on original straw, and the pulp is suitable for 9-point corrugating straw paper as well as for wallboard and hard board. A number of questions asked concerning this process were answered by H. Morley, managing director, Thomas Board Mill, Ltd., Purfleet, England, inventor of the process. Mr. Morley stated that this process had been in operation in England for five years and that it was working out satisfactorily. The over-all consumption of caustic soda was 8 to 10 per cent based on dry pulp produced. Mr. Morley stated that it required twenty minutes from the time the straw entered the apparatus until the washed pulp was ready for final refining. It developed during the discussion that the straw pulped in this manner was apparently too raw to be used by itself



The TAPPI group was entertained by the Alton Box Board Company and taken on a tour through the plant

and required the addition of paper stock to produce satisfactory corrugating material.

The Strawboard Industry and Rule 41

"The Stake of the Strawboard Industry in Rule 41," by J. R. Little, chemist, Hinde and Dauch Paper Company, Sandusky, Ohio, was the final paper of the technical session. In this presentation Mr. Little gave a brief history of Rule 41 from its inception up to the present time and enumerated some of the problems which now confront the strawboard industry. He discussed the trend toward new methods of testing and their possible effects on 9-point strawboard. He pointed out that the G. E. puncture test, the G. E. stiffness test, the flat crush test, and the beam test on corrugated board, while purported to be measures of box performance, have not proved themselves to be any better measures than the Mullen test. Ninepoint strawboard has proved in the past that it is one of the best mediums available for corrugating. This committee and the strawboard industry should work toward improvement of straw pulp as a corrugating material and toward developing such tests as will be a true measure of performance.

Entertainment and Tour of Plant Arranged by Alton Box Board Co.

At the complimentary luncheon given by the Alton Box Board Company following the technical session, W. F. Gillespie, technical director, Gaylord Container Corporation, Bogalusa, Louisiana, and president of TAPPI, outlined briefly the setup of TAPPI, its functions and its services He paid a tribute to the Fibrous Agricultural Residues Committee for its activity in promoting technical advances in the strawboard and container industries and pointed out that increased participation of the industry personnel in such activities would greatly benefit everyone concerned.

After the luncheon, a conducted tour was made of the Alton Box Board Company mills. Particular interest was evinced by this group in the new 7-cylinder, 210-inch trim board machine which had been put into operation recently.

On Thursday evening, all present at the meeting were entertained at a complimentary reception and dinner given by the Alton Box Board Company. Fred Olson, technical director of the Western Cartridge Company, East Alton, Illinois, spoke briefly on present research trends and on the role of research in industry. G. S. C. Semmens, technical director of the Australian Paper Manufacturers, Ltd., Princes Bridge, Melbourne, Australia, gave an entertaining and interesting talk comparing Australian conditions with those in the United States. He described some of the difficulties encountered in developing suitable paper products from their main source of wood, eucalyptus, and he pointed out that they had succeeded in producing a large number of acceptable types of paper from this short-fibered wood. Straw pulp is being produced in Australia for corrugating paper by processes similar to those used in this country. The stream polution problem of their present straw pulp mill has been temporarily solved by diverting the waste straw liquor to farms adjoining the mill property. The soil on these farms has been enriched considerably by this black liquor. Mr. Semmens concluded with an invitation to all those present to visit their Australian paper mills.

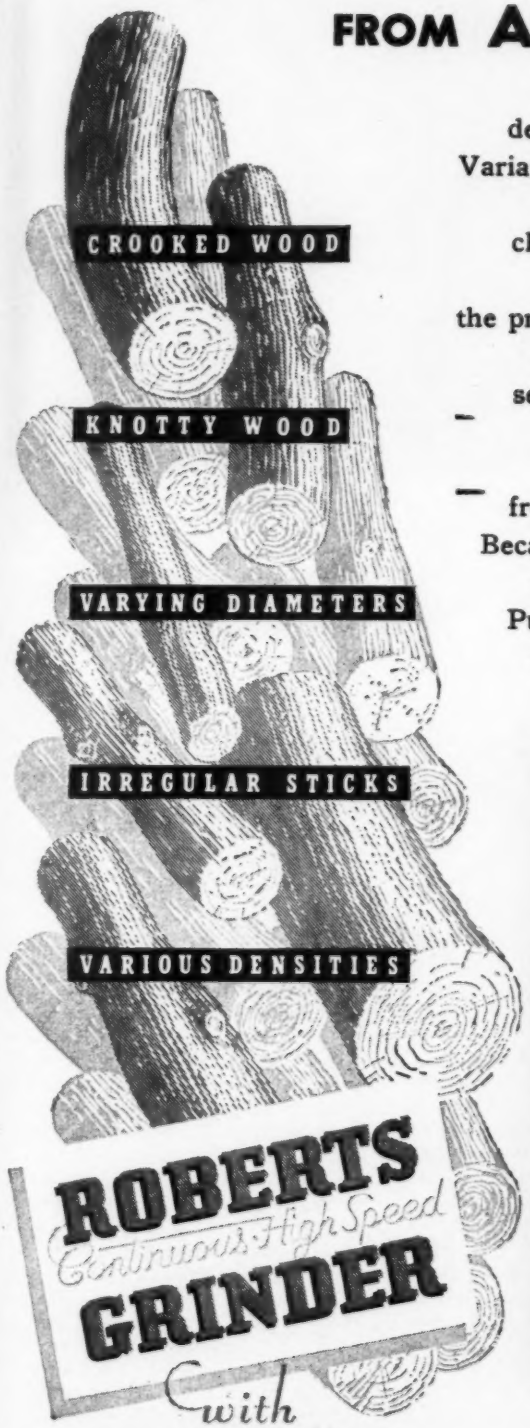
Value of Laboratory Tests in Board Industry

The final speaker on the dinner program was Don L. Quinn, president of the Don L. Quinn Company, Chicago, Illinois, who talked on "The Commercial Testing Laboratory Angle in the Board Industry." Mr. Quinn stressed the value of laboratory tests in determining the performance properties of the finished container. He discussed the Mullen, tear, puncture, and crush tests and indicated that while all of these were important, the tear, puncture, and crush tests apparently showed the greatest degree of correlation with performance. However, even this correlation is not too good and further work on these tests is required.

Practically all of those present at the technical session were present at the committee meeting on Friday, October 23. Dr. Aronovsky gave a brief report of the general activities of the committee since the New York meeting in February and then called upon Dr. Lathrop to report on the meetings held at the Northern Re-

UNIFORM GROUNDWOOD PULP

FROM ALL KINDS OF PULPWOOD



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While going through the plant of the Alton Box Board Company, visitors paused for inspection and direction

gional Research Laboratory, Peoria, Illinois, on January 13 and May 28 in connection with the committee projects on straw procurement and baling. Dr. Lathrop gave a brief history of these projects to date. The discussions at these two Peoria meetings have resulted in considerable improvement in baling straw with the one-man baler. Specifications set up by the committee were discussed with the farm equipment manufacturers, resulting in eliminating misconceptions by both the strawboard people and the equipment manufacturers. The outcome is that the one-man balers have been improved sufficiently to nearly meet the desired straw bale specifications. Dr. Lathrop pointed out that it required nearly seven years of active work by the committee and the Northern Regional Research Laboratory to reach the present state of development in procurement and baling. The Northern Laboratory was active for several years in this work prior to the formation of the Fibrous Agricultural Residues Committee and its participation in this program. He stressed the fact that this project is not yet complete and that while eventually industrial straw users will obtain the type of straw package desired, these results should not be expected too soon.

Dr. Aronovsky then reported on the meeting held at the Northern Laboratory on April 1 with several manufacturers of preservative chemicals to work out a program on preserving baled straw in ricks. This program was set up as a co-operative test among a number of strawboard mills, each mill using several chemicals, and applying one chemical in two concentrations to the top surface of each rick under test. The application of these chemicals was started during the summer on the 1947 crop of wheat straw. Preliminary reports made by the strawboard mills conducting these tests indicate that is is difficult to ascertain the preservative effects of the various chemicals at this early date.

Reports by Chairmen of Subcommittees

A. Procurement Storage and Preservation

H. M. Blandin, chairman of this subcommittee, was unable to be present, but the reports by Drs. Lathrop and Aronovsky on the Peoria meetings covered the work of the subcommittee. Dr. Aronovsky stated that he had learned from Professor C. J. Willard of Ohio State University that the test run on control plots at the Ohio State University during the past year favored still more strongly the practice of removing the straw from the land immediately after harvesting, in order to obtain normal yields of clover and alfalfa following the wheat crop. A suggestion was made that it might be desirable to have Dr. Willard report on this work at the next annual meeting of TAPPI, and this suggestion was approved by the group present.

B. Raw Materials Classification

Dr. Aronovsky reported on the projects of the Pulp and Paper Section of the Northern Regional Research Laboratory. Studies on the physical, chemical, and pulping characteristics of wheat straw from the dominant species in the large wheat producing areas of the United States are in progress. A project has been started on determining the size and shape of the fibers, cells, and plates isolated from the physically different structural parts of straws from wheat, oats, barley, rice, and rye. The work of the Northern Regional Research Laboratory on correlation of the various pulping processes for use on wheat straw and on the development of a pulping method to obtain high-yield, easy-bleaching, strong pulp from straw is being written up for presentation at the February, 1948, meeting of TAPPI.

C. Pulping

Mr. Stahl reported that he had written to most of the strawboard mills to ascertain the type of laboratory pulping and control equipment available in the various mills, with a view to determining where development work on pulping could best be accomplished. In this connection it was pointed out that a large number of strawboard mills had begun to use sodium sulphite as an ingredient in their pulping liquors, with the primary aim of producing stronger pulp and reducing the lime required in cooking. It was suggested that it might be desirable to correlate the data from these mills on cooking with sodium sulphite, and that Mr. Stahl present a paper on this work at the February meeting.

D. Board and Paper Manufacture

M. F. Knack, chairman of this subcommittee, was unable to be present. It was reported, however, that he is conducting a survey on all of the

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pulping and papermaking equipment available in the strawboard mills with the view of using this information to study means of reducing water consumption and stream pollution and to work on methods of improving the manufacture of strawboard. It was suggested in this connection that it would be desirable to invite Professor D. E. Bloodgood of Purdue University to discuss his results to date, on methods of reducing stream pollution in strawboard mills, at the next New York meeting.

E. Testing

Mr. Wilson stated that his paper given at this meeting constituted the work of his committee. A discussion was then held on the correlation of the physical tests of corrugating paper with its performance in the finished container. The majority of those present thought that the Mullen, puncture, and Riehle or crush test did not correlate sufficiently well with box performance. It was pointed out that box performance did not always reflect the properties of the corrugated medium. A laboratory corrugator in which single-faced or double-faced corrugated board could be made readily, and tested before the corrugated paper was shipped out of the mill, would be a desirable instrument. Correlation then could be made of the results from the laboratory corrugator with those of commercial corrugated products prepared from the same paper. Mr. Wilson is to survey the strawboard mills for ideas along this line and several of the mill representatives present indicated that they will work actively with Mr. Wilson in developing a method of making laboratory corrugating tests.

After a group luncheon visits were made to the Owens-Illinois Glass Company, Alton, Illinois, and to the Western Cartridge Company, East Alton, Ill.

About eighty people attended the technical session and committee meeting and the other activities at this meeting. All stated that it was a profitable and enjoyable meeting. Most of those present joined in the lively discussions at both the technical session and the committee meeting. A large part of the credit for the success of this meeting is due to the hospitality of the Alton Box Board Company and its officers in helping develop the program and in providing the facilities for carrying it out. Particular thanks are due to M. W. Swaim, first vice president and general manager, and to N. F. Wilson, chief chemist, of the Alton Box Board Company.

This was the first meeting of this group held at a mill, and all who attended this meeting stated the hope that similar meetings would be held at the other mills in the industry.

◆

▶▶▶ THE MERIT AWARD in the paper manufacturers division of the 1947 Direct Mail Advertising Association competition was awarded to *Westvaco Inspirations for Printers*, published by the West Virginia Pulp and Paper Company. This was the third consecutive year that the publication has received major awards in this competition.

◆

▶▶▶ A CLASSIFICATION system for the more than 11,000 welding patents now in the Davis Welding Library at Ohio State University has been established, according to Dean Charles E. MacQuigg of the College of Engineering. The project, which will enable industries, students and research workers to obtain more readily information on all patents granted in their specific lines, is under the supervision of Dr. W. H. Simon of the University of Toronto.

We're making a slight change...

● Effective November 1st, 1947, The Solvay Process Company and Solvay Sales Corporation have been merged into their parent company, Allied Chemical & Dye Corporation. The business of the merged companies will be continued under the name "THE SOLVAY PROCESS DIVISION, Allied Chemical & Dye Corporation" and "SOLVAY SALES DIVISION, Allied Chemical & Dye Corporation," respectively—with no change in personnel. Neither will there be any change in the traditional quality of Solvay products . . . nor in the dependable Solvay service which has been helping American industry for over sixty-six years.

● In other words, except for changing the lettering on the doors, our sales offices will continue as before at the addresses listed below.

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1 North LaSalle Street	Chicago 2, Ill.
3008 Carew Tower	Cincinnati 2, Ohio
926 Midland Building	Cleveland 15, Ohio
7501 West Jefferson Ave.	Detroit 32, Mich.
921 Main Street	Houston 2, Texas
1107 Pere Marquette Bldg.	New Orleans 12, La.
43 Exchange Place	New York 5, N. Y.
12 South 12th Street	Philadelphia 7, Pa.
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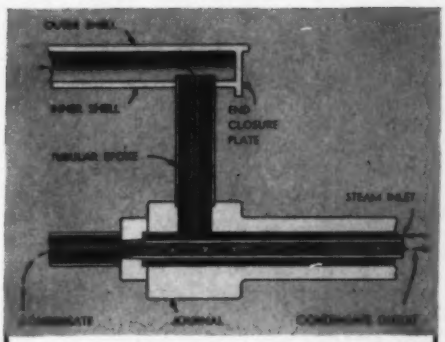
10. Steel plate construction reduces weight, saves on operating costs.
11. Can be made in a wide range of designs.
12. Sizes from 2 feet to over 18 feet in diameter.
13. Can be designed without bolts, nuts, or siphons to work loose in service.
14. Can be used in the high temperature range that employs high boiling point, heat transfer liquids.
15. Steel plate outer shell provides the soundness required for any type of machine finish.

Bulletin 358 tells the story of Lukenweld Jacketed Drier Rolls . . . shows specific instances where drying rate has been stepped up as much as 50 per cent. Write today for your copy. Lukenweld, division of Lukens Steel Company, 408 Lukens Building, Coatesville, Pa.



Section of a typical Lukenweld Jacketed Drier Roll showing how steam is guided in restricted area between inner and outer shells, providing greater steam velocity and improving heat transfer properties.

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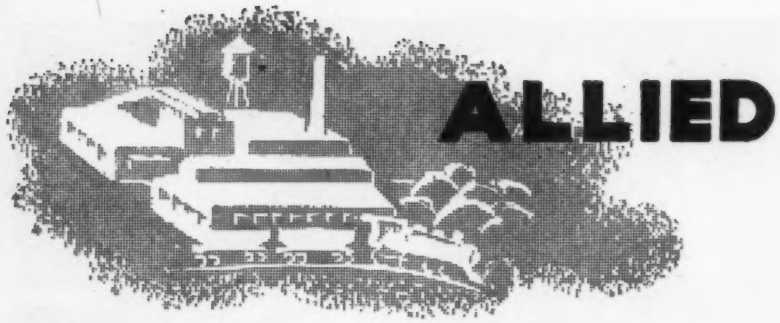


EASTWOOD-NEALLEY CORP. MARKS 3 ANNIVERSARIES

A triple anniversary was celebrated as a dinner meeting by the Eastwood-Nealley Corporation, Belleville, New Jersey, on the evening of October 16, at the Waldorf Astoria Hotel in New York. One of the anniversaries was that covering the arrival of young John Eastwood one hundred years ago at Belleville and his establishment of a business there to manufacture black liquors for setting colors in cloth fabrics.

Thirty years later, Mr. Eastwood assisted two young men in establishing the firm of Eastwood, Buchanan and Smith to manufacture wire cloth and other paper mill equipment. Thus the name of Eastwood first came to be known to the paper industry seventy years ago, and that date represented the second of the three anniversaries.

The third anniversary represented fifty years of association with the paper industry of Calvin H. Nealley, president and general manager of the Eastwood-Nealley Corporation. Mr. Nealley's career in the industry started with his association with the Otis Falls Pulp Company at Portland, Maine. In 1898, he became assistant manager of the purchasing department of the International Paper Company in New York. In 1908 he joined the Eastwood organization as treasurer and assistant general manager, and in 1921 he became president and general manager.

Harry Specht, vice president of the Eastwood-Nealley Corporation, acting as toastmaster at the anniversary dinner, introduced Mr. Nealley to the approximately 175 dinner guests. Mr. Nealley, a personal friend of many of the guests present, simply stood and graciously made a bow.

The speakers of the evening were: Dr. Arthur A. Hauck, president, University of Maine; and the Honorable Fred A. Hartley, Jr., United States House of Representatives.

Dr. Hauck mentioned that there is an inclination for folks to dwell on the troubles they are having. He said that it is good to look back. He took the year 1847 as the guide post which year, he related witnessed the end of the war with Mexico; that Texas was annexed to the United States only two years before; that gold had not yet been found in California; that the famous telegraphic message of Samuel Morse, "What hath God wrought!" was sent only three years before; that canals at the time were beginning to lose business to railroads; and that the country was just on the threshhold of great industrial development.

Dr. Hauck also called attention to the need of good leadership. In looking ahead, he said that he tries to think of what we have on the credit side. The political situation, he added, is not an easy problem to handle, but it is nothing new.

The biggest problem as Dr. Hauck sees it is the avoidance of war. In his opinion, it is necessary for this country to build a structure that will insure the peace of the world.

In concluding his remarks, Dr. Hauck said, "Let us look forward to the next century. We shall need perseverance, industry and vision, but let us hopefully go on."

The Honorable Mr. Hartley in a very interesting and helpful address did much to clarify some of the common misconceptions concerning the Taft-Hartley Law. He emphasized that the Law has been grossly misrepresented; that all that has been attempted in its shaping is to write equity in the labor laws. He pleaded for Labor and Management to give it a fair trial. Labor, said he, can remain strong only as long as we have the free enterprise system in America.

◆

VISITORS GIVEN TWO-MILE TOUR OF ACME STEEL PLANT

Almost 24,000 visitors took a two-mile tour through the Riverdale (Ill.) plant of Acme Steel Company when open house was held September 30 and October 1.

During the two-hour visit guests saw steel hot rolled, cold rolled, coiled and cut to length, galvanized, and further fabricated into the many Acme products. In addition to the manufacturing operations, a quarter mile of 104 customer exhibits showing products and parts manufactured from Acme strip steel was viewed. This extensive display of customer items, ranging from steel tubing to electric appliances, was believed to be a unique feature in industrial open houses.

Stockholders, customers, industrial neighbors, high school students, suppliers, governmental and civic representatives, local business and fraternal organizations were also among the visitors.

The host company served ice cream and gave each guest a souvenir issue of the employee newspaper, describing the company's history and the manufacturing processes viewed.

◆

NEW ELECTRO-ALLOY FOUNDRY

Electro-Alloys Division of the American Brake Shoe Company has announced the opening of its new $3,000,000 high alloy foundry at Elyria, Ohio.

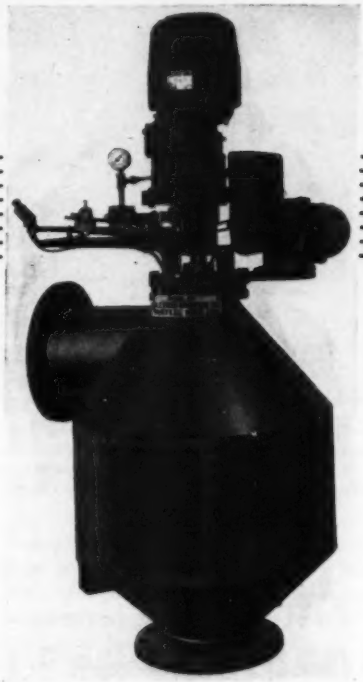
The new plant has been designed and built to take advantage of three important ingredients necessary in the making of quality high alloy castings that have high resistance to heat and corrosion. These ingredients are research, engineering and quality control.

A completely equipped metallurgical research laboratory and experimental foundry is maintained at Mahwah, New Jersey. This laboratory functions without interference from production schedules and conducts metallurgical research on a strictly development basis.

In addition to the Mahwah Research Laboratory, on-the-ground control is constantly maintained by the Elyria plant metallurgical laboratory. This laboratory also acts as liaison between the plant and the Mahwah Research Laboratory.

Ground was first broken for the new Elyria plant in September 1945. Construction was completed in July, 1947. The new building was erected by Hunkin & Conkey Construction Company of Cleveland, Ohio. Architectural and engineering designing was done by the Brake Shoe Company's Construction and Maintenance Department.

The new plant has over 150,000 square feet of floor space. This includes a two-story office building; a two-story welfare building with lunch and wash rooms; a fully-equipped dispensary; pattern shop and storage building; a building housing the heating plant; a machine shop building, and the foundry itself, which measures 460 x 280 feet. All construction is of steel and brick with generous use of



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Piping is greatly simplified because no overflow is required and there is no dilution of the stock in the storage chest.

This regulator is just one more reason why you should submit your consistency control problems to DeZurik. We have the most complete line and can offer money-saving recommendations.

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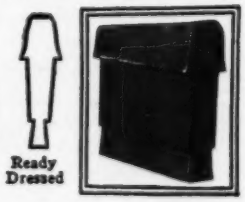

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LEFT—The Electro-Alloys melting department. In the left foreground are three electric arc furnaces used in melting Thermalloy, the heat and abrasion resistant alloy. Behind them are three induction furnaces, used in melting chemalloy, the alloy for corrosion resistance . . . RIGHT—The large molding floor at the Electro-Alloys plant. In the left foreground is a rack-type oven used in baking small cores. In the extreme right background is a sandslinger which is used in making molds for large castings

glass block throughout. The roof is monitor type covered with precast concrete slabs.

Nine power ventilators in the monitor roof remove smoke and gases from the melting furnaces and from the pouring floor. With this equipment, a complete change of air is effected every six minutes.

Three electric induction melting furnaces (200 lb., 1,000 lb. and 2,000 lb. capacity top charge) and three top charge, hydraulically controlled electric arc melting furnaces (1,000 lb., 3,500 lb. and 10,000 lb.) are located in the center of the foundry. These six furnaces supply metal to any point in the foundry with minimum time and travel. An automatic electrical installation controls the furnace operations.

The centrifugal casting department has both vertical axis and horizontal axis casting machines. Vertical axis castings up to 4 feet in diameter can be produced. The horizontal axis equipment permits the production of castings up to 17 in. outside diameter by 12 ft. long.

Necessary heat treating, from stress relieving at low temperatures to quench annealing of Chemalloy stainless castings at 2200 Fahr., is handled in two electronically controlled furnaces. A quench tank at floor level is located between the two furnaces.

Castings are finally inspected in three general ways: X-ray. All castings for certain specific operating conditions are subject to thorough X-ray examinations.

Microscopic surface fissures, invisible to the naked eye, are located by Zy-Glo equipment. This consists of a "black light" unit which contains a lamp that emits near-ultraviolet light in the wave-length range between 3,200 and 4,000 angstrom units.

Cracks in castings are also revealed by subjecting them to Pressure Testing by oil, air or water.

The Electro-Alloys machine shop is equipped to handle practically all necessary machining operations on heat, abrasion and corrosion resistant castings produced at this foundry.

Patterns made in the plant range in size from a few inches to over ten feet in length. The larger sizes are limited only by facilities available for making the actual casting. Certain complex patterns are made with mahogany and other expensive hard woods. Standard pattern woods such as white pine, maple and amberwood, are also used.

Brake Shoe Company's alloy production was formerly divided between the old Electro-Alloys plant in Elyria and the alloy department of the American Manganese Steel Division's plant in Chicago, which has been making alloy castings since 1925. All Brake Shoe alloy production will now be concentrated at Elyria. When in full production this foundry will double the previous heat—and corrosion-resistant alloy production of the Brake Shoe Company.

Founded in 1902, American Brake Shoe Company, with its ten divisions and four foreign subsidiaries, operates a total of 60 plants, over 40 of which are foundries. The company is a member of 42 communities located in 21 different states, Canada and France.

GARDNER-DENVER CO. OPENS THREE NEW BRANCH OFFICES

Domestic branch offices of the Gardner-Denver Company now total twenty-nine since the recent opening of three new sales and service offices in New Orleans, Cleveland, and Kansas City.

New branch managers are M. B. Morrisette, New Orleans branch; R. A. Williams, Cleveland branch; and E. C. Wallace, Kansas City branch. The company has called A. C. Beeson, former manager of the branch in Detroit, to the main offices in Quincy, Illinois. G. A. Murphy now manages the Detroit office.

◆

▶▶▶ A UNIT for the manufacture of monochlorobenzene, a basic material used in the manufacture of DDT, has been installed by the Pennsylvania Salt Manufacturing Company, Philadelphia. The MCB plant has been located at the company's Wyandotte (Mich.) plant because it ties in well with chlorine production there. The polychlors, by-products of the MCB unit, can be used as raw material in other chlorinated organics now under study in the Pennsalt Research Laboratories.

◆

CONSTRUCTION BEGINS ON NEW CANADIAN CHLORINE & CAUSTIC SODA PLANT

A new chlorine and caustic soda plant is under construction for the Dominion Alkali & Chemical Company, a subsidiary of the Dominion Tar & Chemical Company, Ltd., at Beauharnois, Quebec. The plant which will have a rated daily production capacity of sixty short tons of chlorine and sixty-seven tons of rayon grade caustic soda, is expected to be in operation on January 1, 1949.

The H. K. Ferguson Company has started the initial construction opera-

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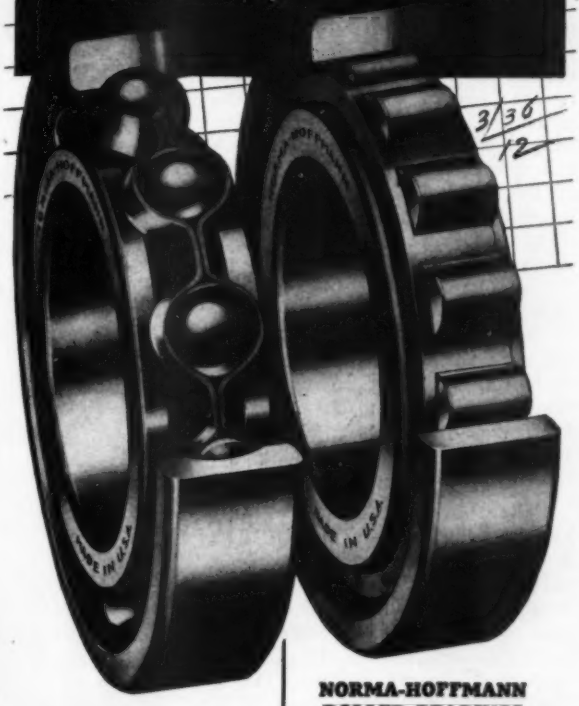

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Rugged — thoroughly dependable for carrying thrust and radial loads.

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Short, cylindrical roller design . . . heavy-duty bronze retainer . . . lowest possible co-efficient of friction under heavy load.

Norma-Hoffmann heavy-duty Bearings improve the design and performance of products wherever they are used. They are dependable, give friction-free smoothness and quietness of operation. Available in a wide range of sizes for every load, speed and duty. Write for catalog and engineering assistance.

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tions which consist of building roads and railroads to the site and erecting a building to serve as offices for construction personnel. The design of the plant is especially unique, Ferguson engineers stated, because high strength caustic soda will be produced without the use of special evaporating equipment.

◆

SAMUEL M. LANGSTON CO. HOLDS OPEN HOUSE FOR EMPLOYEES AND FAMILIES

An open house for employees and their families was held by the Samuel M. Langston Company (Camden, N. J.) October 12. Families of the 229 employees attending brought the total attendance to 925.

The open house afforded the employees the opportunity to show their families where they work, what they do, and the types of machinery made by the Langston company. Refreshments and momentos of the occasion were distributed. One momento was a little booklet giving a brief history of the company, a list of company benefits for employees, and a description of the type of machinery produced.

This October marked the thirty-fifth anniversary of the completion of the company's building at its present location. The company recently made a 57 x 130 ft. addition to its plant for use as a machine erection floor. The engineering department also was enlarged, and several alterations were made to existing buildings.

◆

▶▶▶ DIVISIONAL MANAGERS of Nordberg Manufacturing Company, Milwaukee, who have been promoted to vice presidencies of the company are: Roland W. Bayerlein, heavy machinery division; H. H. Talboys, railway equipment division; D. A. Cheyette, crusher division; and R. R. Shafter, process machinery division.

◆

MONSANTO BUILDS NEW FORMALDEHYDE PLANT TO INCREASE RESIN OUTPUT

Construction of a new unit to produce formaldehyde for expanded output of plastic resins was announced recently by Monsanto Chemical Company's Plastic Division. Ground has been broken for the new unit at Springfield (Mass.), and construction is expected to be completed in the second quarter of 1948.

The new plant, added to the newly constructed wood flour plant at Springfield, and to the company's phenol plant at East St. Louis, Illinois, and the melamine plant at Everett, Massachusetts, will make Monsanto's Plastics Division independent of outside basic chemical sources for components of these two resins.

More than 900 employees visited the plant when Samuel M. Langston & Co. held open house

◆

▶▶▶ THE NEW OFFICE of Permutit Company in Rochester, New York, replaces the one formerly located in Syracuse which is now closed. This branch was directed by F. D. West, veteran sales engineer who is retiring after 29 years of service with the company. Austin F. McCormack, of the

Austin F. McCormack (left) and F. D. West

New York office of The Permutit Company, has been named sales engineer in charge of the newly established office. He received his engineering degree at Stevens Institute and later attended the U. S. Naval Academy at Annapolis.

◆

ALLIS-CHALMERS COMPANY DESIGNATES NEW SALES REGION IN NEW YORK AREA

Organization of a fifth region under the long-range sales plan of the Allis-Chalmers general machinery division has been announced. Formation of the first four regions in the field organization was revealed earlier this year.

The new area, designated as the Empire region, will embrace territory now covered by New York, Buffalo, Rochester, Syracuse and Newark offices. Arch J. Cooper, New York district office manager, will assume the additional duties of regional manager. Vernon L. Spinney, formerly New York petroleum sales representative, has been appointed assistant district office manager.

◆

▶▶▶ ALL MANUFACTURING rights for "Nail-It" Pipe Couplings, "Nail-It" Mud Guns, "Nail-It" Swivel Joints and Pump Suction Couplings have been acquired by the Hinderliter Tool Company Division of the H. K. Porter Company, Inc., Tulsa, Oklahoma. These products will be manufactured at the Hinderliter's Tulsa works under the new trade name "Nail-It-Kwik."

◆

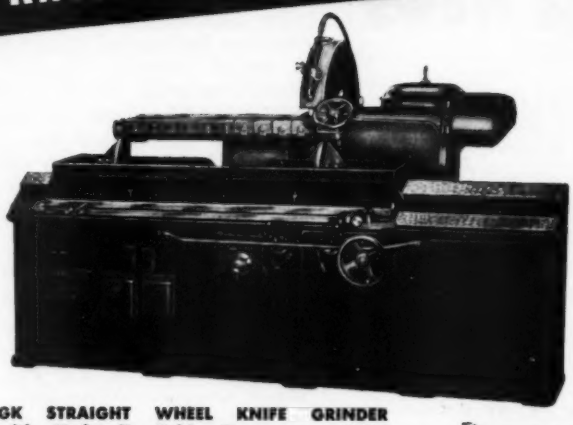
▶▶▶ A LONG TERM LEASE on a new factory building in Stratford, Connecticut, has been signed by Manning, Maxwell & Moore, Inc. (Bridgeport, Conn.). Production of the company's Ashcroft Gauge line will be moved from Bridgeport to Stratford, opening the way for expansion of the Consolidated Safety Valve and American Industrial Instrument lines.

◆

▶▶▶ NEW EQUIPMENT now being installed in an addition to the No. 3 Drum Shop of The Babcock & Wilcox Company, Barberton, Ohio, will facilitate the handling of large drums and vessels for several industries including paper and chemical.

HANCHETT GK KNIFE GRINDERS

Here's Why You Can Be Certain of Precision High Speed Performance



GK STRAIGHT WHEEL KNIFE GRINDER with Hydraulic Table Traverse — ACME Knift Bar is mounted on table.

CONSTRUCTION IS RUGGED—

There are four models of GK Knife Grinders—each featuring the sturdy, durable cabinet base construction, extra wide ways, self-adjusting to compensate for wear.

OPERATION IS FAST—

GK's are fully automatic—equipped with mechanical or hydraulic table traverse—built-in-wheel dresser. Choice of magnetic or ACME Knife bars for fast, simple setups.

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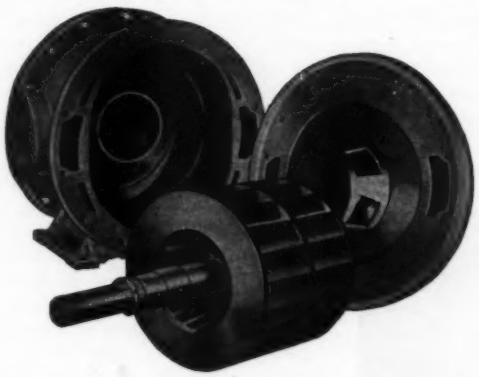

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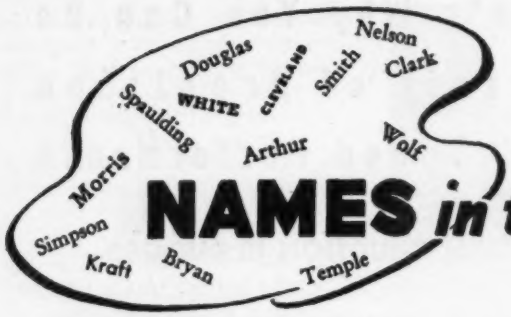

PERSONALS

DR. KENNETH GLIDDEN NOW MEMBER OF INSTITUTE STAFF

The Institute of Paper Chemistry, through its executive director, Westbrook Steele, is pleased to announce the appointment to its staff of Dr. Kenneth E. Glidden, formerly of the Brown Company (Berlin, N. H.). His title will be that of research associate, and his responsibility will be that of group leader of the Pulp and Paper Technology Section. In this position he will be active in both the educational and research functions of the Institute.

Dr. Glidden received his undergraduate training at the University of New Hampshire. He received his Ph.D. degree from Johns Hopkins University and carried on post-graduate research at this institution for an additional year; during this time he held a Brown Company fellowship. During his year of postgraduate research, he was a part-time instructor in general chemistry.

He was a research chemist for the Brown Company from 1933 to 1944; from 1944 to 1947, he served as assistant supervisor of pulp research.

During the war years, in addition to his duties for the Brown Company, he was an instructor at the University of New Hampshire, assisting in its war training program; he taught the chemistry of pulp and paper and basic engineering mathematics and science. During his last two years at Berlin, he participated in the adult education program of the public schools, teaching engineering mathematics.

Dr. Glidden is a member of the American Institute of Chemists and of several honorary chemical and scientific societies. He has published articles on pulp and paper in the business press, and results of his research at Johns Hopkins University appeared in the *Journal of the American Chemical Society*.

◆

ALLAN HYER NOW ASSOCIATED WITH BAGLEY & SEWALL CO.

As this issue was ready for the press, an announcement by Abe Cooper, president of The Bagley & Sewall Company, Watertown, New York, states that Allan Hyer, widely known for his long association with Black Clawson Company, Hamilton, Ohio, has become associated with Bagley & Sewall. The new connection was effective November 1.

Mr. Hyer has been closely associated with the industry and its affiliates, and during the war, he held a government position with the War Production Board.

◆

▶▶▶ The Marinette Paper Company, subsidiary of the Scott Paper Company, has announced three promotions at its plants at South Glens Falls and Fort Edward, New York. *Henry W. Fales*, plant engineer, has been promoted to general superintendent of manufacturing, engineering and maintenance operations at both plants. Paper mill superintendent at the plants will be *Charles M. Sigvardt*, technical control director. *James S. Brown* has been transferred from the company's Chester (Pa.) plant to become assistant paper mill superintendent of the two plants.

◆

▶▶▶ Associated for many years with the Jessup & Moore Paper Company (Elkton, Md.), *Edwin A. Weihenmayer Jr.* has been appointed manager of the paper division of Franklin Research Company, Philadelphia.

◆

▶▶▶ At a meeting held recently at the Mohawk Valley Paper Company, Little Falls, New York, the following persons were re-elected directors: *Avery Stone, Charles H. Burrows, John McEwan, Mrs. Charles H. Burrows, Loomis Burrell* and *David H. Burrell, Jr.*

GEO. M. PENNOCK AND HENRY LEHMUTH ARE NOW WITH MOORE & WHITE CO.

George M. Pennock has been appointed executive engineer for The Moore & White Company, Philadelphia, and Henry Lehmuth III has been named plant manager.

Formerly, Mr. Pennock was chief engineer for Bagley & Sewall (Watertown, N. Y.). He was associated with that company for thirty-one years.

Mr. Lehmuth joins Moore & White after six years as chief industrial engineer for the Philadelphia Division of the Bendix Aviation Corporation. Previously he was supervisor of industrial engineering for the Philco Corporation, Philadelphia.

George M. Pennock

Henry Lehmuth III

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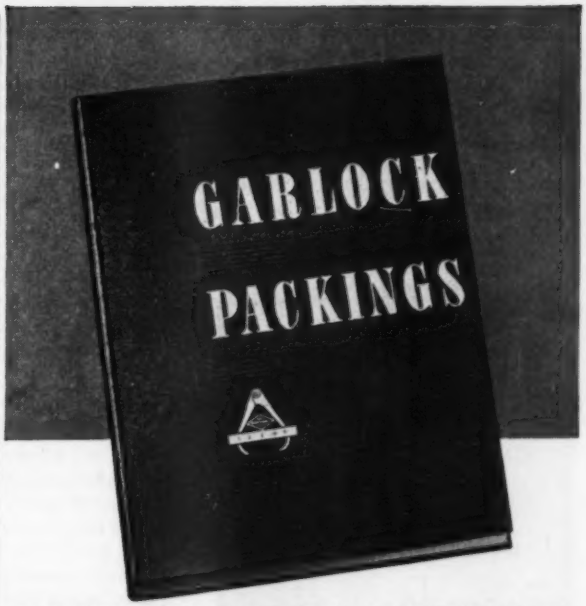

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PI-11

W. R. CAHILL APPOINTED PERSONNEL DIRECTOR OF NEKOOSA-EDWARDS CO.

William R. Cahill has been named director of personnel administration of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin.

Mr. Cahill joined the Nekoosa-Edwards organization in 1922, starting in the Port Edwards finishing department. During his twenty-five years with the company he worked successively in the mill office, accounting department, sales and scheduling, and the department of priorities and government statistics which he headed during the recent war years. As head of the latter department he was responsible for the handling of the intricate details connected with government allocation of raw materials vital to the operation of the mills. He has served in the department of personnel administration since 1945.

W. R. Cahill

◆

▶▶▶ Formerly with the *Wall Street Journal* covering the pulp and paper and publishing industries, *Samuel Shane* will now be engaged in public relations work for St. Regis Paper Company, St. Regis Sales Corporation, and St. Regis Paper Company (Canada) Ltd. He will be a member of the staff of Kenneth D. Lozier, vice president of St. Regis Sales Corporation. Mr. Shane also was financial editor of the *Montreal Gazette* for ten years.

◆

▶▶▶ The promotion of four men to top executive positions has been announced by West Virginia Pulp and Paper Company, New York City. *George N. Hoover, Jr.* and *Ray A. Stocker* have been named assistant managers of the Mechanicville, New York, plant; *Melvin L. McCreary* has been advanced to assistant manager of the Williamsburg (Pa.) plant; and *J. Lynne Ferner* has been promoted to general superintendent of the Tyrone (Pa.) plant.

◆

▶▶▶ Former assistant sales manager of the Hamilton (Ohio) division of The Black-Clawson Company, *Rudy L. Kutter,* has been appointed sales manager. *Sam T. Weber* will assume the duties of assistant sales manager. These changes became effective October 16.

◆

RECENT RETIREMENTS

T. W. Estabrook retired recently from the position of manager of purchasing, Brown Company, Berlin, New Hampshire, a position he has held since 1939. Mr. Estabrook organized the first central purchasing system of the company in 1914. He was widely known within the industry and had contributed to the trade press.

George S. Johnson has retired from active work in the industry after twenty years in sales work with Champion Paper & Fibre Company. Previously, Mr. Johnson was associated with other paper companies for twenty-five years. The New York Division of the Salesmen's Association of the Paper Industry held a special luncheon in honor of Mr. Johnston.

Paul R. Bachman, vice president and general manager of Riegel Paper Corporation also was honored by the Salesmen's Association (N. Y. Div.) with a special luncheon on the occasion of his retirement.

◆

▶▶▶ Vice president of Bulkley, Dunton Paper Company, S. A., *Frank W. Smith,* has sailed on the Queen Elizabeth and will make an extended trip in the Scandinavian countries and western Europe. Mr. Smith's mission will include visits to Sweden, Norway, Finland, the Netherlands, Belgium, France and England. The purpose of his trip is to gain first-hand knowledge of the present condition and future outlook of the European pulp and paper industry and its relation to the world market.

◆

▶▶▶ Chief engineer of research and development, *H. C. Edwards,* has been appointed director of research and development of The Timken Roller Bearing Company, Canton, Ohio. He succeeds *J. F. Leahy,* 65, who retired recently after forty-five years of service with the company. *Walter F. Green,* the assistant manager of research and development, will become manager of the department.

C.R.P. CASH LEAVES BROWN AT LA TUQUE—TO BE WITH CO. PULP DIV. AT BERLIN

C. R. P. Cash, superintendent of Brown Corporation's mill at La Tuque (P. Q.) since 1945, will take charge of starting up the new kraft mill of the Brown Company, Berlin, New Hampshire. Upon completion of this project, he will assume the duties of general superintendent of pulp production for Brown Company. Another addition to the pulp division personnel is Lamar M. Murray.

Among other appointments of the Brown Company was that of Cameron Duff, special assistant to H. J. Humphries, to be in charge of sales for the Brown Corporation. Bertram J. Jacobs has been appointed power engineer with the Power and Steam Division, and William R. Reekie has been placed in the technical division as a trainee.

◆

▶▶▶ An employee of the company for fifteen years, *Orville D. Latimer,* has been named superintendent of the paperboard mill of the Pacific Paperboard Company at Longview, Washington. George Pietila, William Brill, Elmer Baranick, and Walter Byrum are the assistant superintendents of the four-machine mill.

Orville Latimer

◆

▶▶▶ The assistant manufacturing manager of the General Electric Company's Plastics Division, *Addison E. Wiles,* has been appointed manager of the Pittsfield Molded Products Works (Pittsfield, Mass.). Mr. Wiles succeeds *Arthur C. Treece* who has been named assistant manager of the new G-E plastics laminating plant at Coshocton, Ohio.

▶▶▶ Two sales executives have been appointed by the Westinghouse Electric Corporation, Pittsburgh. *John E. Payne,* formerly manager of industrial sales, has been named manager of all industry sales departments for the corporation, with general over-all responsibility for sales of equipment to all industries. *R. S. Kersch,* who has been manager of the company's Houston, Texas, office since 1942, was named manager of industrial sales to succeed Mr. Payne.

◆

▶▶▶ The promotion of *Raymond C. Pettit* to the position of mechanical superintendent of the San Francisco and Oakland plants of the Standard Paper Box Mfg. Company (Reading, Pa.) has been announced. He will also retain his present position as mechanical superintendent of the Associated Paper Box Company at Longview, Washington, subsidiary of the Standard Paper Box Company.

◆

RAYMOND H. JEBENS JOINS PATTERSON AS CHEM. ENGR.

Raymond H. Jebens has joined The Patterson Foundry & Machine Company, East Liverpool, Ohio, as chief chemical engineer, according to a recent announcement. He will be available for consultation on processing problems and will apply his experience to the development and application of Patterson equipment.

Raymond H. Jebens

Mr. Jebens was formerly associated with the DuPont Company, where his work included synthesis experimentation and process engineering in organics, heavy chemicals, and paints. He has also been associated with Kimberly-Clark Corporation as chemical engineer.

▶▶▶ At a directors meeting of the Lithographic Technical Foundation, Inc. on October 23 in Detroit, *R. Verne Mitchell,* of Harris-Seybold Company, Cleveland, was elected a director to fill the unexpired term of the late A. Stull Harris. Mr. Mitchell had been a director of the Foundation from its inception until 1946.

◆

F. BARBER IS PLANT MGR. NEW GRAND RAPIDS PLANT AMERICAN COATING MILLS

The American Coating Mills Division of Owens-Illinois Glass Company has appointed Fred Barber to be plant manager of its newly acquired plant at Grand Rapids, Michigan.

This plant formerly was known as the Grand Rapids Paper Box Company. As a new division it will manufacture both folding and setup boxes.

Mr. Barber has been with American Coating Mills (headquarters, Elkhart, Ind.) for about three years. Before his appointment to Grand Rapids he was in charge of the laminating department and manager of the New Product Development Division. After graduating from New York State College of Forestry, Mr. Barber entered the paper industry by becoming associated with Container Corporation of America at Philadelphia. Later, he was with Stein, Hall & Company, handling adhesives and starches to the paper industry in the eastern states. During the war, Mr. Barber served with the Navy Department in Washington as chief of Containers Division, Office of Procurement and Materials.

◆

▶▶▶ Pacific Mills, Ltd. (Ocean Falls, B. C.) has appointed *R. R. Edwards* its assistant resident manager. He was formerly connected with the Bathurst Power & Paper Company, Ltd. (Bathurst, N. B.). *G. R. Bolton* is now traffic manager for Pacific Mills, Ltd.

◆

▶▶▶ *O. P. Fussell* has been named superintendent of the Thompson, New York plant of the United Paperboard Company, according to a recent announcement by that company. Mr. Fussell already has taken on his new position.

◆

▶▶▶ A salesman in the St. Louis territory for the past twelve years. *Neal M. Draper,* has been named manager of the St. Louis branch of Solvay Sales Corporation, New York. He succeeds *M. S. Johnson* who has been transferred to the Boston office. *Elmer Seener* has been appointed assistant branch manager of the St. Louis branch.

ROBERT G. FAIRBURN NAMED AS PRESIDENT OF DIAMOND MATCH COMPANY

Robert G. Fairburn, first vice president of Diamond Match Company, has been elected president and chief executive officer, succeeding his father, the late William A. Fairburn. At the same time, the board of directors elected H. F. Holman as chairman.

Robert G. Fairburn

Mr. Holman has been treasurer of the company since 1921 and a director since 1934. Henry G. Lucas, now secretary, was named vice president and secretary.

Mr. Fairburn was president of the B-F-D Company, largest producer of strike-on-box matches in the U. S. and manufacturer of paper and woodenware, from 1942 until the company's merger with Diamond last spring. He had joined B-F-D in 1932 and was elected first vice president of Diamond following the merger. He has been a director of Diamond since 1941.

◆

▶▶▶ *Arthur Nikand* has been appointed factory manager of the Portland, Oregon, plant of the Hyster Company. Mr. Nikand was first employed at Hyster in 1934 as a machinist after working in a similar position for Willlamette Iron and Steel Company, Portland, for ten years. He was appointed foreman of hoist equipment assembly in 1938 and assistant factory manager the next year.

◆

▶▶▶ New executive director of the Packaging Institute, Inc., New York, is *Dr. Laurence V. Burton.* He succeeds Albin Dearing who has resigned to enter into other work. Dr. Burton has been editor of *Food Industries* for

the past seventeen years and has been a member of its editorial staff since it was started in 1928. He has had an active interest in packaging since this important fuction first became recognized.

◆

JOHN H. HINMAN RESIGNS AS HEAD OF CANADIAN INTERNATIONAL PAPER CO.

At a recent directors meeting, John H. Hinman resigned as president of Canadian International Paper Company, Montreal. S. L. de Carteret, vice president and general manager, was elected to succeed him.

Richard C. Doane, vice president, was named general manager, and Cyrus F. Inches was added to the board of directors. Mr. Hinman will continue as a director.

◆

▶▶▶ *Homer L. Dillard*, controller of The Champion Paper and Fibre Company, Hamilton, Ohio; *Willard B. Gorsuch*, controller of The Black-Clawson Company, Hamilton, Ohio; and *Charles P. Taylor*, chief accountant of the Continental Paper Company, Ridgefield Park, New Jersey, have been elected to membership in the Controllers Institute of America.

◆

▶▶▶ Alloy Steel Products Company (Linden, N. J.) has appointed *H. E. Johnson* as Chicago district manager with headquarters at the company's new sales office at 332 South Michigan Avenue. Mr. Johnson was previously with Edward Valves, Inc., as sales engineer in the Chicago area and with the Crane Company in Chicago and Philadelphia.

◆

▶▶▶ *Bruno L. Berklund* has joined the Woodlands Department of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin. He will be engaged chiefly in a land inventory program which includes cruising and evaluating Nekoosa-Edwards timber holdings and prospective land purchases. Another phase of his work will be assisting in the formation of a management plan for the entire forest holdings.

◆

▶▶▶ Several new appointments have been announced by the Brown Company (Berlin, N. H.). *Cameron Duff*, special assistant to H. J. Humphries, will be in charge of sales for the Brown Corporation. *Bertram J. Jacobs* has been appointed power engineer with the Power and Steam Division, and *William R. Reekie* has been placed in the technical division as a trainee.

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NECROLOGY

AUGUSTUS G. PAINE

Former head of the New York & Pennsylvania Company, New York City, Augustus G. Paine passed away at his home in New York, October 23, at the age of 81.

Mr. Paine was associated with the company for many years. He served as president, then as board chairman, until his retirement in 1945. The company, which originally was the Champlain Fibre Company, was founded by his father.

Survivors include four sons: George Eustis, Alexander Brooks, Hugh E., and Peter S. Paine; also a daughter, Francisca Warren Paine.

◆

HOMER EUGENE STAFFORD

Well known in the industry for many years, Homer Eugene Stafford passed away October 23 at Lansdowne, Ontario, where he had resided with relatives since 1946.

Mr. Stafford had been inactive for several years. His last connection was with Hawthorne Paper Company, Kalamazoo, Michigan, where he was general superintendent. He was 75 years of age.

In New York State where he grew up, Mr. Stafford first entered the papermaking industry when he was 13 years of age; he began his apprenticeship as a reel boy in the mill of H. Remington and Sons, Watertown, New York. He worked the night shift—from 6 o'clock in the evening until 7 in the morning—for five cents an hour. He changed positions with several mills and by the age of 17 he had become a machine tender. He worked for Knowlton Brothers, in Watertown, several times during a period of 27 years, and in the spring of 1926 he left Watertown for Kalamazoo, Michigan, where he became associated with Hawthorne.

In 1926, Mr. Stafford served as first vice president of the American Pulp and Paper Mill Superintendents Association. He also had been divisional chairman of the Northern New York Division of that Association.

◆

AARON C. BAGG

Former president of the Parsons Paper Company, Holyoke, Massachusetts, Aaron C. Bagg passed away October 19 at his home in Holyoke. He was 62 years of age.

Mr. Bagg joined the Parsons company in 1907 as a receiving clerk. He later served as secretary and vice president and upon the death of his father, Edward Parsons Bagg, in 1931, he was made president. Aaron Bagg (grandfather of the deceased) and J. C. Parsons founded the Parsons Paper Company in 1852 at Agawam. A year later, the location was changed to Holyoke.

An ornithologist of note, Mr. Bagg was, at the time of his death, an honorary vice president of the Massachusetts Audubon Society. He collaborated on a standard work on birds of the Connecticut Valley.

Survivors are the widow and a son, Aaron Moore Bagg; also three brothers —Robert P. Bagg (Old Greenwich, Conn.), Dr. Edward P. Bagg, president of the Parsons Paper Company, and John L. Bagg, president of the Millers Falls Paper Company.

◆

▶▶▶ Former chief forester for the Brown Company (Berlin, N. H.), *Scott S. Lockyer*, 63, passed away at his home in Eustis, Maine, late in September. He started with the company in 1911 and retired in 1943. His widow and one daughter survive.

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Fig.1640
"King Clip" Gate

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Union Bonnet Gate

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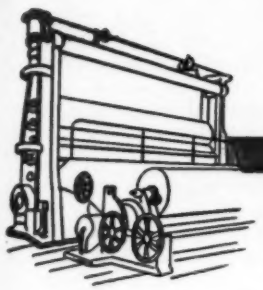

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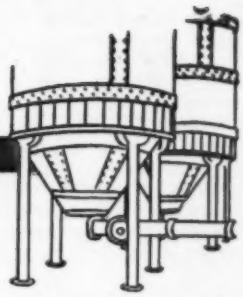


Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

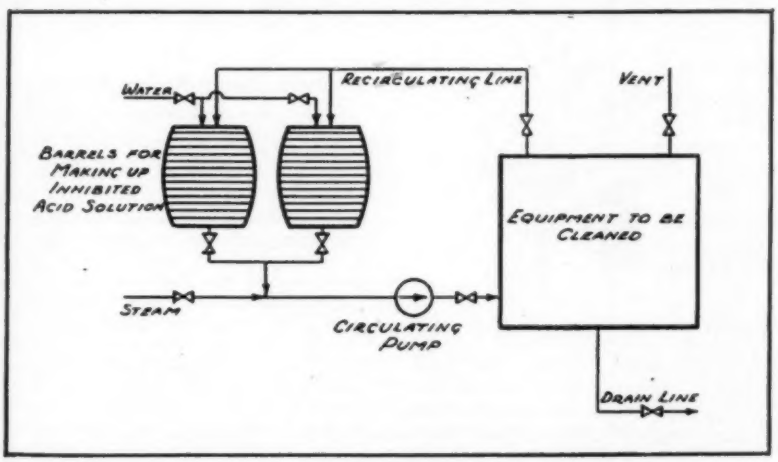
Acid Cleaning of Boilers

The use of an inhibited acid for the removal of scale from boiler metal surfaces has been practiced for some years. Within the past few years, however, there has been a considerable improvement in the technique along with the development of a number of new inhibiting agents.

Because of their relatively low cost, availability and the number of satisfactory inhibitors obtainable, hydrochloric acid and sulphuric acid are most practical in effecting a rapid removal of scale. Among the inhibitors used are anthracene, dextrin, glue, glucose, pyridine, theourea, quinoline, organic amines, coal tar derivatives, and a variety of proprietary products. Hydrochloric acid is the better solvent for the constituents usually found in boiler scale since these are converted to the soluble chlorides by this reaction. However, selection of the acid as well as the inhibitor to be used with the acid will depend upon the analysis of the sample of deposit and the degree of solubility effected.

Any brass or bronze parts should be replaced temporarily with steel or steel alloy equipment. Steps should be taken to vent the acid vapors properly since these are extremely corrosive for they contain no inhibitor. Before the cleaning action is started, valves connecting the boiler with the main steam header should be closed. This, of course, would be followed if other boilers in the plant are in operation. Should the boiler to be cleaned be the only one in the plant, this valve should nevertheless be shut off to prevent any distillation of hydrochloric acid over into the steam line where subsequent condensation would set up a corrosive condition.

Two general methods are used for acid cleaning of boilers, the "circulation" method and the "fill and soak" method. In the first method, the cleaning solution is circulated continuously through the unit until cleaning action is completed as shown by tests while in the latter method, the cleaning solution is permitted to soak in the unit for a prescribed length of time. The circulation method is well adapted to units with positive liquid flow paths and offers excellent control of the cleaning operations by regular tests. The "fill and soak" method can be used when positive circulation of the cleaning solution cannot be readily obtained. This "fill and soak" method does not offer the ordinary advantages of check testing during the cleaning action; however, less chemical supervision is required during the process.



Arrangement for acid cleaning of industrial equipment

For the continuous circulation method it is advantageous to have two or more inlets at the bottom of the unit to assure complete distribution of the inhibited acid solvent and to assure positive circulation through all parts of the unit. The solvent is returned from the highest point of the unit to a tank equipped with a clean water line, steam line and drain. In general, a corrosion resistant pump with a two-hour pumping capacity slightly greater than the cubical content of the unit should be employed. A small tank or barrel should also be provided for adding the inhibited acid to the suction side of the circulating pump in the proper ratio with the hot water.

The unit is filled to overflow with clear warm water (temperature should be the maximum permitted by the inhibitor used) and circulated until a constant temperature is obtained on the effluent. Inhibited acid is then added at such a rate as to provide a 3% acid solution entering the unit and this feed is continued until tests on the effluent solvent indicate that maximum acid content has been reached. Should continued testing of the effluent solvent reveal a 1% drop in acid content, sufficient inhibited acid should again be added to obtain a 3% acid content on the influent solvent. Circulation of the solvent through the unit continues until the acid content of the returned solvent is constant thus indicating the end of the reaction between the solvent and the boiler deposits.

The unit is flushed with clean warm water until tests on the returned flushing water show it to be free of acid and soluble iron salts since the subsequent neutralization would produce the adhering gelatinous precipitates of iron. A 10% soda ash solution is introduced for neutralization and circulated until the returned water shows a definite alkaline reaction. To aid in the neutralization as well as to release from the metal the hydrogen generated during the cleaning procedure, the unit can be fired at 50 psi or somewhat higher after circulation has been stopped and the water level dropped to normal. The unit should be vented on occasion during this period to permit the escape of the liberated gases. The neutralizing solution is drained and the unit flushed with clean warm water before being put back in service.

For the "fill and soak" method, a tank equipped with clean water and steam lines should be employed. Provision should be made for the introduction of the inhibited acid to the suction side of the pump used for filling the unit. The unit should be vented and an overflow to waste provided.

Soaking time depends upon the type and estimated quantity of deposit as well as the rate of reaction between the solvent and the scale as determined by laboratory tests. In this method a solvent of 5% acid strength is usually employed.

Inhibited acid is added in the proper ratio to the warm water (at maximum

temperature permitted for inhibitor) entering the unit to give a cleaning solution of the desired acid strength and the unit is filled to overflow. The vent is opened and soaking is carried out for the pre-determined length of time. At frequent intervals samples can be drawn from available points and tested for acid strength. Although these samples will not be representative of conditions throughout the unit, an indication will be given as to the amount of deposit removed.

The cleaning solution is drained to waste after the prescribed length of time and the unit is flushed to overflow with clean warm water. Draining and flushing continues until the flush water is free of acid and any soluble iron salts. The unit is then filled with the neutralizing soda ash solution and permitted to stand for a short period of time. The level can then be lowered to normal and the unit fired as described under "circulation" method.

While the technique of acid cleaning has progressed to the point where there is little danger of corrosion during the process, to safeguard both equipment and personnel, the cleaning procedure should be carried out only under experienced supervision. In addition, it should be recognized that acid cleaning is not a substitute for proper water conditioning. Except in unusual cases, the use of proper chemical treatment, intelligently controlled, can maintain heat exchange surfaces free of undesirable deposits.

—W. H. AND L. D. BETZ.

◆

Drying Motor and Generator Windings

Machines in continuous operation will stay at a temperature sufficiently above room air to prevent condensation of moisture on and about the windings, even if the location is very steamy. However, cold motors and generators readily accumulate moisture, causing gradual deterioration of insulation. This may happen either in service or in storage when the temperature of the machine is below the dew point of the air. Where a machine has to be idle for a long time, a simple method of keeping the windings dry is to cover the machine with a piece of canvas, leaving a hole at the top for escape of heat and moisture, and to heat the interior of the "tent" with incandescent lamps or small space heaters, so as to keep the windings a few degrees higher than the surrounding temperature.

Treatment of Dampness — Dampness will be indicated by low insulation resistance. Deep penetration of dampness calls for special treatment.

(1) External heat can be applied under a well-ventilated canvas cover. Heating should not go beyond 194 Fahr. (90 C.) as water must not be boiled in the insulation.

(2) Current can be circulated through the windings by applying a low voltage to the windings. Current should be only a fraction of full-load current, and the temperature limitation of 194 Fahr. (90 C.) should be observed.

(3) Insulation resistance tests should be taken at intervals to note the trend. The machine can be put into load service somewhat below the recommended reading in megohms (million ohms), because load heating will continue the drying-out process.

Treatment of Submerged Machines—If the machine has been submerged for some time, it must be carefully checked to see if rewinding is necessary. (In the case of d-c machines, water between the commutator bars and the shell may be the source of low-ground resistance.) Rewinding is almost certain to be required, sooner or later, if the motor has been "drowned" in salt water. After cleaning, some salt may remain, and if so, it will combine with moisture from the air.

Care of Inclosed Machines — Totally inclosed machines, if idle in a damp place, should be examined periodically, as the insulation may gradually absorb moisture from the entrapped air. Presence of water in enclosed motors almost invariably indicates leakage at shield joints, hand-hold covers, lead entrances, etc. Such leakage may be avoided by use of sealing greases or compounds.—Preventive Maintenance of Electric Motors and Generators (TM55-405) WAR DEPARTMENT TECHNICAL MANUAL.

◆

Do Liquids Flow in Manner Illustrated?

Here are two sketches, both incorrect, that are typical of what are commonly seen in publications almost every day. In each case, the stream is shown as growing *larger* as it falls. As a matter of fact,

it grows *smaller*. Once in a while actual photographs of streams of this kind are reproduced, and, of course, the photographs are correct.

Why does a stream grow smaller as it drops—because the velocity of the stream increases in strict accordance with the laws of gravity. When the liquid first leaves the opening its velocity is small. Therefore, the cross-section of its stream at that location must be greatest. In these sketches, it is smallest.

The cross-sectional area multiplied by the velocity gives the quantity of liquid flowing.

After the liquid has fallen one foot, say, the time elapse is about ¼ of a second and the velocity is about 8 fps. Then, if the velocity at the opening is one foot per second, the cross-sectional area at the open-

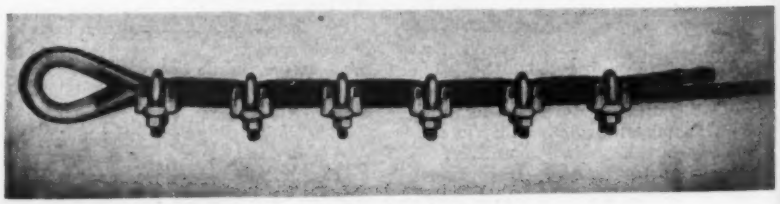
ing will be eight times as great as it will be at the point one foot down. Now go to a point 4 ft. down. The liquid will reach that point in half a second, and the velocity will be 16 fps. In other words, the cross-sectional area here will be one-sixteenth of the cross-sectional area at the opening. W. F. SCHAPHORST, M. E.

◆

Simplify Steam Piping Systems

A high degree of safety and efficiency can be obtained as a result of intelligent installation and subsequent care of steam piping. In piping layout the best way is usually the most direct way. In most plants numerous alterations and additions have been made to the original layout. Runs of piping no longer in use often reach out in all directions. A careful diagrammatic study of actual needs may often make it possible to eliminate unused lines and dead-ends. Simplification of piping cuts down the length of steam travel from boiler to consuming unit. This results in less heat loss enroute, a cooler plant and lower maintenance costs.—*G. E. Coons, District Engineer,* AMERICAN MUTUAL LIABILITY INSURANCE CO.

How to Attach a Wire Rope Clip



Correct Way: U-Bolt of all clips on dead end of rope
—John A. Roebling's Sons Co.

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Use Ladders Safely

Do's

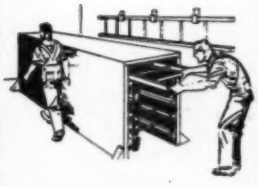
Use ladders that are in good condition—clean, dry and free of cracked or broken uprights or rungs. Use unpainted ladders. Paint may cover defects in material and construction. Inspect ladder for splits or cracks before you start climbing.

Place ladders at an angle to prevent them from falling backwards, or slipping at the bottom—with feet approximately one-quarter ladder-length distance from the wall. Use ladder of adequate length. Use non-slip feet at all times and have ladder held or tied if there is a chance that non-slip feet won't hold.

Face ladder and hold it with both hands when ascending or descending. See that ladder is placed so that work is accessible without excessive reaching.

Keep tools and other materials being used while on a ladder in a safe type of holder, secured to person or ladder. Use a hand line to convey tools or materials to the top of a ladder, or have some one hand them to you.

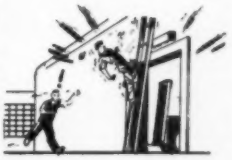
Arrange to have only one man on a ladder at a time. Use additional ladders, or erect a scaffold if others must work with you on a job.



Store ladders in proper place, on wall brackets or in racks, where they will not be a hazard to passing workers, become misshapen, or have objects stored or dropped on them. Carry ladder with end ahead of you raised above head level, in case you meet some one unexpectedly.

Don'ts

Don't use a wet, oily or dirty ladder, or one with broken, patched or cracked uprights or rungs. Never use a ladder with missing rungs. Do not climb a ladder when your shoes or hands are greasy or slippery, or when wearing cuffed trousers. Do not paint ladders.



Don't place ladder in front of unguarded door opening. Never stand ladder on a box, truck or other movable object, nor leave bottom of ladder without adequate protection. Never lean a ladder against an unstable object.

Don't slide down a ladder, nor attempt to ascend or descend with back to ladder.

Don't place tools or materials on a ladder where they will drop off and injure some one below. Do not carry things in your hands up or down a ladder—keep your hands free for holding on to ladder.

Don't permit others to mount ladder while you are on it. Do not lean so far from either side of ladder that you will lose your balance and fall—move the ladder.

Don't leave ladder on the floor, or leaning against a wall when not in use. Do not carry a ladder so anyone can walk into it.

Adapted from Industrial Safety Charts, Series H, U. S. Department of Labor

Hazards Related to Paper Finishing Operations*

WILLIAM C. BERTHOLD
Asst. Finishing Dept. Supt.
The Mead Corporation

It is indeed a privilege and a pleasure for me to open this afternoon session talking to you very informally on the hazards related to paper finishing operations. Before starting on our main topic, it might be of interest to look back briefly over the paper industry of several decades to see what conditions existed in the earlier days of the industry; after World War I and in the early 20s the paper industry became well established. At that time, however, little attention was given to the safety of the individual on the job. Hazards were numerous; horseplay was prevalent among employees; accidents were frequent, and management seemed little concerned about these conditions.

As the industry started to expand, management began to realize that the safety of the individual on the job would be an important factor both from a standpoint of economy and efficiency of operation. Most mills started on a safety program shortly after World War I and great progress has been made since that time. Perhaps many of you were in on the beginning of your safety program, and I think that you will agree that your task at the beginning was not an easy one. There were a lot of obstacles to overcome. Safety had to be sold to supervisors and foremen as well as to the man on the job. It was a rather difficult task to sell safety to men of the old school. Their thinking and philosophy concerning the job was much different than it is today. They had their own individual ideas and were reluctant to change any of their methods or ways when someone else made suggestions to them.

With the introduction of technical methods to the paper industry and an improvement in equipment and methods of handling material, the thinking of men on the job began to change and at this point the safety of the man on the job became a factor to be considered. From this point on safety became an established principle, and its importance grew rapidly with the expansion of the industry.

Today the paper industry ranks sixth in importance of all industries in this country and the safety program in general has played an important part in the success of the industry.

In speaking of hazards related to paper finishing operations, we will divide the operations into five groups, discussing the hazards of each group separately. We will consider the finishing operations as that phase which has to do with the processing of paper from the time it leaves the paper machine until it is ready for shipment and divide the operation into five groups; namely, supercalendering, rewinding, rotary cutting, sorting, trimming and packing operations.

A survey of 130 lost-time and medical expense cases occurring in the finishing operations of our plant over a 20-year period showed that:

28.5% of the accidents (37 cases) happened in calendering operations
26.9% of the accidents (35 cases) happened in rewinding operations
18.5% of the accidents (24 cases) happened in cutting operations
26.1% of the accidents (34 cases) happened in sorting, trimming and packing operations.

This indicates that all hazards involved were general and were not limited to any particular finishing group.

Supercalenders

Of all the hazards encountered in calendering operations, perhaps the inrunning nip between the calender rolls is the most dangerous. The operator and helper both must thread paper into the nip on each roll run and while this is a common practice and an everyday job, it must be performed with care and in a safe manner. One moment of inattention may mean the loss of a finger or hand.

A guard should be used to cover the nip while the calender is in operation, and can be made either stationary or removable. The removable guard is the most practical because it can be adjusted to fit the nip as the diameter of the composition rolls change.

Where nip out or blow rolls are used they should be spaced properly so that the operator has sufficient room to work. A threading speed of 40 to 50 feet per minute is considered to be the most practical from a safety and operating standpoint because it gives the operator sufficient time to properly thread the calender.

Calender platforms and steps are often the cause of accidents through falls—and these should have proper guard rails attached and should be free of oil and grease. They should be made of good material and should be wide enough to permit free movement of the operator or helper.

Men working on supercalenders should not wear loose clothing, or go about the job with rags hanging loose from their pockets. The wearing of jewelry while on the job should be discouraged.

Shafts used in loading calender rolls should be made of material, that is light in weight, yet strong enough to support the weight of the roll without breaking or snapping off on the bearing end. A considerable number of accidents have been caused by shafts falling or dropping on the employees' feet. The use of a shaft dolly while loading and unloading will minimize this condition. If a calender is loaded mechanically from a crane, the cables should be inspected frequently and changed when necessary to prevent breaking under load.

If roll wagons are used in moving stock to and from the calender, they should be properly constructed and proper type blocks should be used to minimize the hazard caused from falling rolls.

I should like to say, in concluding my remarks on calendering hazards, that sufficient working space, good housekeeping, proper instructions to employees and properly maintained calendering equipment will minimize the hazards connected with calendering operations.

Rewinders

The hazards encountered in rewinding operations are somewhat similar to those mentioned in the calendering operations. In the modern two-drum type rewinders, we find an inrunning nip which is very serious. Many serious accidents have been caused by employees getting their hands and arms caught between the roll and the drum. With a hazard of this nature ever present it is not only necessary but essential that a proper type guard be provided and that it be kept in place when the winder is in operation.

The placing and tightening of cores on the rewinder shaft is to a certain extent hazardous but this condition can be eliminated by the use of proper type metal stands. When the loading of shaft and cores into the winder bearings is done by hand, the lifting should be done by the operator and helper. A set of hooks attached to the winder can be used to facilitate the handling of the shaft into the bearings, thus relieving the operator and helper of an excessive amount of strenuous lifting.

The wearing of loose clothing, and jewelry, should be discouraged among employees working on rewinders, and safety shoes should be a part of their wearing apparel.

When cranes are used to load and unload the rewinders, frequent inspections of the cables should be made to prevent breaking under load. If chain falls are used, the same frequent inspection should be made of that part of the chain which is in constant use.

Roll wagons used for moving stock to and from the rewinders should be kept in good condition and proper blocks should be used to prevent rolls from falling off the wagon while in transit.

Cutter Operations

The hazards involved in rotary cutting operations are for the most part similar to those encountered in the calendering and rewinding operations and are found mostly in the loading and unloading of the back-stands.

Here again it is necessary to keep crane cables and chain falls used in loading in proper condition so that continuous heavy loads can be handled without being hazardous.

The guarding of expansion pulleys and other moving parts is necessary to prevent operators from coming into contact with them in the normal course of their work.

Roll shafts should be kept in proper condition to prevent breaking under load and skids used in the Cutting operations should be of proper size and should be kept in good repair. Due to the nature of the work involved in cutting operations, all employees should be encouraged to wear safety shoes. Here again the wearing of jewelry and loose clothing should be discouraged.

Sufficient working space is most essential in cutter operations and it should be provided wherever possible.

Sorting Operations

The hazards involved in the Sorting operations are of a minor nature and can be kept under control by the use of proper

(*) Paper presented before the Paper and Pulp Section of the National Safety Council at the Annual Safety Congress held in Chicago, October 6-10, 1947.

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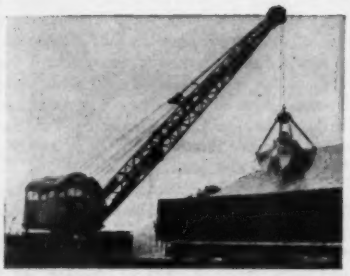

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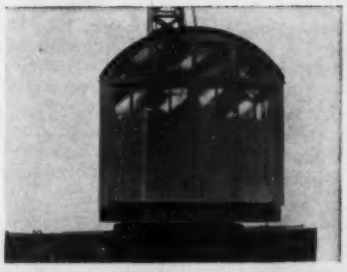

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handling equipment. Correct spacing of material in the working area, and the proper use of storage space, will minimize the hazards. Paper cuts on the hands are the most frequent hazard and these need cause no trouble if the employees will get first-aid immediately.

Trimming and Packing Operations

The hazards involved in trimming and packing operations can be kept at a minimum by the use of proper handling equipment and with sufficient space for employees to work.

The trimmer press undoubtedly is a hazardous piece of equipment, yet, with proper instructions to the operators, and with proper guarding of the rotating parts, the press can be operated safely.

Perhaps the hazard with which we are most concerned in packing operations, involving roll case, skid, carton, bundle, bales, and framer is the lack of sufficient space to handle peak loads. We cannot always anticipate customer requirements and changes and as a result, we find roll packing operations overloaded at one period and sheet operations overloaded at another period. It is almost impossible to strike a proper balance for any length of time and often it is necessary to shift employees from one operation to another in order to reduce the peak load in one particular place.

The shifting of employees from one job to another and from one department to another naturally constitutes a hazard and it is advisable for the supervisors and foremen to remind their employees when they move from one job to another about the dangers involved in their work.

Considerable progress has been made in recent years in the paper industry in material and finished product handling equipment. The use of power lift trucks, towing equipment, and power loading equipment has made the job easier, however, they constitute a hazard. All employees operating power equipment should be instructed in the hazards involved and operate the equipment in such a manner as to protect themselves as well as other employees in the department.

In concluding, there are several thoughts I would like to leave with you. At present the paper industry is in the process of expansion, many new units of new equipment are being installed, many old units are being modernized. Increased speeds and higher production is the foremost problem of every mill.

In the attainment of this higher production we all have a problem—and that is to do the job without injury to the individual. We are giving considerable thought to the elimination of mechanical hazards, however, we are still confronted with the unsafe worker, who is the greatest hazard in any industrial plant and like anything else, if he cannot be changed he must be eliminated.

The paper industry has a great future and the safe worker will be a vital part of its success.

Questions Discussed at Conference of Paper and Pulp Section of N. S. C.

Reported by H. B. GOODRICH*
Maintenance and Safety Engineer
Strathmore Paper Company

1. Is is necessary for machine crews to run in the mill?

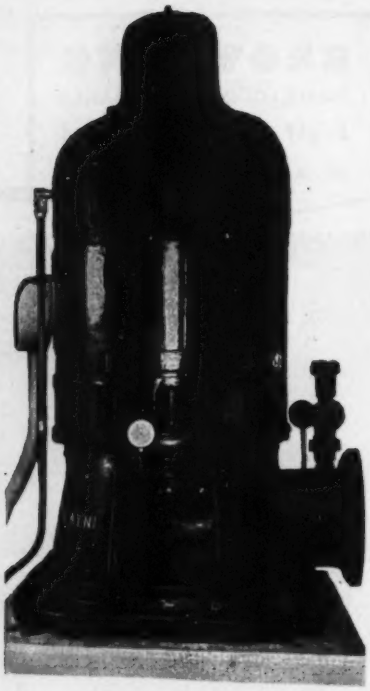
No. What little time is saved by running is of no consequence. This was the conclusion of men who represented companies with machines running 715 fpm, 950 fpm, 240 in. wide running 1000 fpm, as well as those operating at slow speeds.

2. What type of safety devices are used on Cameron Winders?

One company has an angle iron guard 12 in. or 14 in. in front of the roll being wound, which raises and lowers.

It was thought that this question referred to guarding the entering nip of a winder roll. In an ordinary type of Cameron or Langston rewinder that uses a rider roll, no reason could be seen for guarding it on the back side. But it is important to keep the nip guarded.

(*) Mr. Goodrich served as recorder for Conference No. 3: Paper Machines and Finishing, which was one of four conferences held on Thursday afternoon, October 9, as part of the program of the Paper and Pulp Section of the National Safety Conference during the 35th Annual Safety Congress held in Chicago, the week of October 6, 1947.



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One mill has a rule that a roll being wound cannot be touched until it is 10 in. or more in diameter, and there is a guard in front of the nip. A guard 6 in. high which will prevent anyone from going into nip, which has a spring arrangement so that it cannot drop down, has been devised.

An angle iron guard made out of light metal, with two rollers inserted on the back and riding against the roll being wound, will answer. As the roll increases in diameter, the guard will be pushed back so that it is always against the roll. And the two rollers do not mark the paper being wound.

Another mill has the two rollers running against the shaft so as not to mar the paper, and that works all right.

3. How do you prevent telescoping of rolls on the winder shaft?

Many mills use rope to feed the paper onto the shaft as a roll is being wound up to prevent its telescoping, and it has always been a very hazardous operation.

Winder collars are used. Sketches were shown of these.

Another mill has devised a scheme to prevent the loops of rope from forming on the shafts, which is where the principal danger lies.

4. Are direct drives being used on your Cameron Winders?

A big improvement, eliminating the clutch, has been made by the Reliance Electric & Engineering Company. The Mead Corporation is using such drives.

5. (a) Are Safety Belts used when feeding Hydrapulpers?

No. In most all cases, the hydrapulper is completely enclosed or is so high as to make it improbable that a man would fall into it.

(b) How do you lower your man into the Hydrapulper to clean it?

One company has a 30 in. by 30 in. wooden platform that is used in the hydrapulper for the man to stand upon.

All companies agree that the switch must be locked before the man enters the Hydrapulper. One company leaves a man at the switch, and a millwright takes off the spout.

Another company, which feeds from two floors above, has a problem on how to get the man into the Hydrapulper. To use a ladder is almost impossible. They use a boatswain's chair.

(c) How often do you clean your Hydrapulper?

Once a week, once every tour, and once every 24 hours were the answers.

6. What type of device do you use to prevent rolls from turning on the cores?

An expanding shaft or core collars and setscrews.

7. What method do you use to thread the rewinder?

In some mills, three or four men are required to thread the rewinder on the start-up. If the fourth hand is not watching carefully, there is danger of catching the other men's fingers. Now a single man is used, the paper being torn so that it will feed in a tail, thus removing the possibility of injuring the other men.

8. How do you protect men working on power equipment?

(a) All require some protective device that the man himself controls.

(b) Some use tags, made of leather, fiber, metal, or some other substance, with the man's name or number on them.

(c) Some mills use locks, to which the workman himself only has the keys, or with one key in the main office, but the lock must be removed ONLY by the worker himself.

(d) One mill uses an equipment tag in addition to the workman's tag. This equipment tag lists the work to be done, and the machine cannot be started up until the foreman checks to see that everything has been done. This is an added protection, as it would bring to light any worker whose tag had been prematurely removed.

9. What is the penalty for locks or tags being taken off without proper authorization?

Discharge.

10. What is the custom about changing fuses or pulling them while working on electrical equipment?

All agreed that fuses should not be touched by anyone other than authorized electricians.

Some mills, as an added protection, removed the fuses on lines to compensators and switches controlling equipment upon which men are working. Other mills use Square D type safety switches ahead of the compensator and lock these out so that the motor may not be started.

11. How is liquid chlorine handled in your plant?

(a) Who shuts it off?

The chemist in some plants. Beater inspectors in others.

(b) One mill had a bad accident record when a freight car was bumped into the connected tank car. The remedy—they placed the tank car about 20 ft. from the derailer, instead of four to six feet as formerly. Better yet, have a separate siding for the connected tank car and allow only the chemist to have a key to the lock on the switch—not the switching crew.

(c) If a connection becomes broken, water should be played upon the tank to freeze the opening, thus shutting off the flow of gas.

(d) One plant provides gas masks for every worker, with his name on the case. Another plant provides respirators, which will be good for about five minutes, for the machine and beater crews.

The National Safety Council has a data sheet on chlorine. Everyone interested should obtain a copy.

12. How do you take care of slippery and oily floors?

Roofing paper is used by some mills manufacturing it. No adhesive is required. If the floor is wet or damp when the paper is applied, it sticks better.

"Safety Walk" manufactured by the Minnesota Mining & Manufacturing Company, is used by many plants with highly satisfactory results. Other concerns are now making this same material. It works fine, even in oily places. When applying this material around the calendar, don't forget to put it on both the feeding and delivery sides.

For patching concrete floors, only concrete was recommended. A sealer, applied over the patch, often helps it to wear longer.

13. How do you handle the new man on the paper machine who is actually afraid of it?

Transfer him to another department. Don't keep him on the machine—he will be a definite hazard there.

14. What do you do with the old employee who becomes afraid of the paper machine?

Transfer him to another department. Talk it over with the union representative first, if necessary. When transferred, he must take the rate of the job to which he is assigned. In some cases he loses his seniority rights.

15. How would you handle the overambitious fellow who is seemingly not afraid of the machine? He is the fellow who dares to do something that someone else would hesitate to do.

This is a supervisory problem. One fellow handled it by giving the man a mechanical problem connected with safety. After solving the problem, upon which he worked for several months, the man becomes a safe worker.

Use psychology.

There are more injuries from unsafe practices than from unsafe conditions. The safety engineer's work can be made easier if he will put himself in the position where his management is asking the foremen or supervisors why there are injuries in their departments. Then the foremen or supervisors will come to the safety engineer seeking assistance.

How soon after an accident happens is it investigated?

The first investigation should be made within 24 hours. Do not move a thing that would prevent investigation of the real cause of the accident until this investigation has been completed. Get the witnesses to make statements in writing as soon as possible after the accident occurs. If there was oil on the floor and the injured slipped on it, don't let anyone wipe it up until the investigator has seen it. If the accident occurs when the safety man is off duty, the superintendent or his nearest assistant must make the investigation and report. The safety man then investigates the next morning.

How do you take metal, and other foreign substances, out of rubber press rolls on your machine while it is running?

Evidently other members don't have this condition. Only solution offered was to shut down the machine.

18. How would you eliminate the degree of hazard in the removal of calender plugs?

You must shut down the calender and back it up to remove the plugs.

19. Is your paper winder (two drum upright reel) adequately guarded at point of contact?

Some members use air jets at this point. Others thought it depends upon the type of paper being made.

One member has an 8-in. pulley hanging on the end of a rod, which is balanced on the frame. The pulley runs between the reels and prevents the rolls from getting closer together than 8 inches, breaking the paper at that point. This small pulley, which has a weight at the end, doesn't hit either the top or the bottom roll until the rolls get within 8 inches of one another. That is considered the danger point. Then the paper is broken and proper steps taken to remedy conditions without injuring someone.

20. How do you guard the slitter knives?

Quite a few members have a little guard over the top slitter at the point of contact with the bottom slitter. One member has a device made of pipes which throws the slitters out of the way until needed. He will send a sketch of this to the News Letter Editor so that it may be adopted by others, as it appeared to be a safety device with merit.

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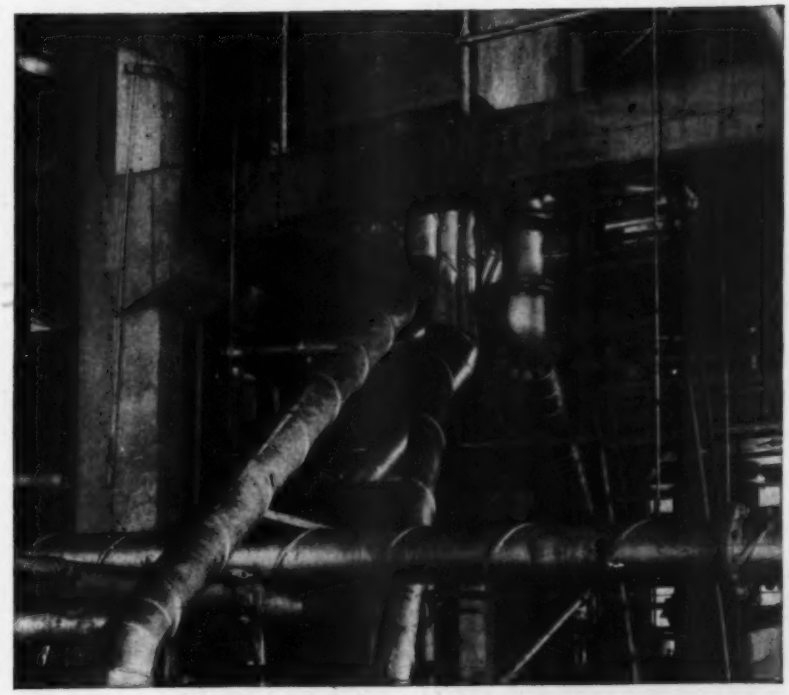

No wonder Naylor is called "the paper mill pipe." Widely used for stock and pulp lines, water lines, exhaust lines and other applications, its versatile performance has made Naylor a stand-by in paper mill service. Sizes from 4 to 30 inches in diameter with all types of fittings, connections and fabrications.

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Convention Papers . . . Abridged

Abridgments in this section are from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry held in New York City, February 24-27, 1947

Sulphate Pulping of Douglas Fir, Western Hemlock, Pacific Silver Fir, and Western Red Cedar Logging and Sawmill Waste

MARK W. BRAY, Chemist
J. STANLEY MARTIN, Engineer
Forest Products Laboratory*

Utilization of the vast quantities of cull material, woods waste, and sawmill waste has long been a challenge to progressive lumber manufacturers of the Northwest as well as to the U. S. Forest Service.

The Forest Products Laboratory at Madison, Wisconsin, recently investigated the possibilities of these waste materials for the production of strong kraft and bleachable sulphate pulps for use in high-quality papers. The wastes consisted of several species including Douglas fir (*Pseudotsuga taxifolia*), Western hemlock (*Tsuga heterophylla*), Pacific silver fir (*Abies amabilis*), and Western red cedar (*Thuja plicata*).

The wood was shipped to the Laboratory from a western sawmill in the form of chips of the general size commonly used for sulphate pulping. Because of their relatively high moisture content (35 to 50 per cent) when received, it was apparent they had lost little water in transit. In addition to the chips, transverse sections of a log of each species representative of the material available at that time at the sawmill were furnished for examination and measurement of density and certain growth characteristics.

Upon arrival at the Laboratory the chips of a given species were thoroughly mixed and run over the Laboratory chip screen. All material passing the 1¼- by 1¼-inch upper screen and remaining on the 5/16- by 5/16-inch lower screen of the chip screen was used for the pulping experiments. There was only a relatively small percentage of oversized pieces and fines which were rejected.

A representative sample of the chips of each species was taken for chemical analysis and, before the digester was charged, each batch of chips was sampled for its moisture content, so that chemical concentrations, liquor volumes, and pulp yields could be calculated on the moisture-free weight of wood charged.

The Douglas fir was by far the slowest growth material of any of the species submitted and it also had the greatest density. The western red cedar had the lowest density, which was noticeably reflected in the pulp yield per unit volume of wood. The heartwood content of the western red cedar was highest, varying from 82 to 91 per cent by volume, average 85 per cent; that for the Douglas fir disks was second, varying from 78 to 84 per cent, average 82 per cent; then Pacific silver fir from 54 to 81 per cent, average 66 per cent; and finally western hemlock, 33 to 72 per cent, average 54 per cent.

The four species varied considerably in chemical composition. These variations are noticeably reflected in yield and strength properties of the resulting pulps.

Two types of sulphate pulping procedures were used, one for the purpose of producing strong kraft pulps of higher yield and the other for the production of bleachable pulps of somewhat lower yield. For the kraft type of digestions all species were reduced under the same cooking conditions, which were so chosen from past experience as to be generally suitable for the production of this type of pulp both in high yield and with high strength properties. The conditions employed, while similar to those commonly used in kraft mill operations, differed in that dilution to the predetermined point was accomplished by the addition of water rather than sulphate spent or "black" liquor.

The bleachable sulphate digestions differed from the kraft-type digestions in that a higher ratio of chemical-to-wood and a higher concentration of chemicals in the cooking liquors were employed for the bleachable sulphate digestions than for the kraft-type digestions. Pulps with two degrees of softness, or bleachability, were made by increasing the time of digestion at maximum temperatures ¾ hour in one digestion over that of another.

Digestion Procedure

All digestions were made on the equivalent of 100 pounds of moisture-free chips in a 14-cubic foot steam-jacketed, tumbling-type digester heated indirectly with steam. A linear temperature-increase schedule was followed allowing 1¼ hours to bring the temperature of the digester from 30 C. to 150 C. and ½ hour from 150 C. to the maximum temperature (170 C.) where it was held for 1½ hours for the kraft digestions and for one type of the bleachable sulphate digestions and for 2¼ hours for the other type of bleachable sulphate digestions.

The sulphidity of the cooking liquors, when calculated on their active alkali content (NaOH + Na_2S calculated as Na_2O) was 30 per cent for all the digestions.

The quantity of active chemicals (calculated as NaOH and Na_2S) charged per hundred pounds of moisture-free wood was 20 pounds (15.62 pounds of Na_2O) for the kraft digestions and 27.5 pounds (21.47 pounds of Na_2O) for the bleachable sulphate digestions. The total initial concentration of active alkali (NaOH and Na_2S) in the cooking liquors, including the moisture in the chips, was 50 grams per liter (equivalent to 39.05 grams per liter of Na_2O) for the kraft digestions and 60 grams per liter (equivalent to 46.85 grams per liter of Na_2O) for the bleachable sulphate digestions. Since indirect steam heating was employed, no further dilution occurred as a result of the cooking operation. The total volume of liquor charged, including the moisture in the chips per hundred pounds of moisture-free wood, was 48 gallons (6.42 cu. ft.) for the kraft digestion and 55 gallons (7.35 cu. ft.) for the bleachable sulphate digestions, making the liquor-wood ratios 4 to 1 and 4.6 to 1, respectively.

Upon completion of the cooking schedules, the pulps were blown at reduced pressure and washed with hot water, screened through an 8-cut (slot openings 0.008 inch width) flat screen, run over the Laboratory wet machine, where they were sampled for their moisture contents, and finally weighed for the determination of the yield.

All calculations of chemicals charged, liquor volumes, and pulp yields were based on the moisture-free weight of chips charged. Bleach consumption and the results of chemical analysis, on the contrary, are reported on the weight of moisture-free pulp tested.

Methods of Testing the Pulps

The freeness of the unbleached pulps was determined by the Schopper-Riegler method. The strength properties of the unbleached pulps were determined on test sheets prepared after processing in a 1½-pound standard beater according to TAPPI Standard T-200m-40, which specified 6,500-gram weight on the bedplate lever for kraft pulps. The unbleached pulps were also chemically analyzed for cellulose, alpha-cellulose, lignin, and pentosan contents and for the chlorine consumption and permanganate number according to TAPPI standard procedures. The single-stage calcium hypochlorite bleach requirement test of the pulps was made by treating a 15-gram sample with 25 per cent of its moisture-free weight of bleaching powder solution (equivalent to 8.75 per cent chlorine) at 40 C. for such a time as was necessary to exhaust the chlorine. The brightness of the unbleached and bleached pulps was determined with a Hunter reflectometer calibrated in accordance with TAPPI method T-217sm-42.

The yields of moisture-free kraft pulp for the four species, when compared on the weight basis, were about the same (ranging from 47 to 49 per cent) for Douglas fir, western hemlock, and Pacific silver fir, but, owing to the high lignin and extractives and the low cellulose contents of western red cedar, the yield of moisture-free kraft pulp from this species was about 10 per cent lower (39.5 per cent, based on moisture-free wood).

The economical utilization of western red cedar by kraft pulping would appear questionable were it not for the excellent strength properties of the pulp. The yield of kraft pulp obtained from the 50-50 mixture of western hemlock and Pacific silver fir chips was about the same as those obtained from pulping the two species separately.

The chemical analytical data indicate that all the experimental kraft pulps were

(*) Forest Service, U. S. Department of Agriculture, maintained at Madison 5, Wisconsin, in co-operation with the University of Wisconsin.

given approximately the same degree of cooking as the commercial kraft pulps made from southern yellow pine, jack pine, and Scotch pine, but were probably not reduced to quite the same degree as the sample of commercial black spruce kraft.

Small differences in lignin, cellulose, and permanganate number, however, tend to indicate that Pacific silver fir reduced a little more readily under the conditions employed than the other three species. On the other hand, western red cedar, because of its high extractives and high lignin contents, has a higher alkali requirement and, therefore, under equal cooking conditions is reduced to pulps of higher bleach requirements than any of the other species. Brightness values of test sheets obtained from single-stage bleachability tests and the permanganate numbers indicate the same trend and show roughly the bleach requirements of the kraft pulps. As of the wood of these western species, the pentosan content of the several pulps was low. Furthermore, the pentosan contents were low in comparison with the values obtained for the commercial kraft pulp samples on which this constituent was determined.

Since the differences in the chemical composition of the experimental kraft pulps are small, any differences in their physical properties may likely be attributable to some physical or morphological characteristic of the fibers rather than to degree of cooking. This conjecture is based on past experience where the proportion of springwood and summerwood was determined on log cross sections. It was not possible to make this measurement on the chips submitted for tests in this work.

The fact that, when compared at a given degree of beating, the pulps obtained from the low density western red cedar excelled all others in bursting, tensile, and folding strengths and in sheet density as well, but were lower in tearing strength strongly suggests that the sample of this species either contained a preponderance of springwood fibers or that the summerwood fibers were thinner-walled than those of the other species.

Fiber measurements on western red cedar (Penhallow, D. P., *Manual of the North American Gymnosperms*. Appendix B 358-361, Ginn and Company 1907) indicate that both the springwood and the summerwood fibers of this species have thinner walls than any of the other three species. It can be expected that thin-walled summerwood fibers would tend to behave like springwood fibers in their effect on pulp properties.

The experimental Douglas fir kraft pulp obtained from logging and mill waste chips was about equal in strength properties to other experimental pulps of this species made previously (Bray, M. W., Schwartz, S. L., Martin, J. S., *TAPPI Papers* 23, 232-238, 1940) (Martin, J. S. and Bray, M. W., *Paper Trade J.* 117, 12, 29-33, September 16, 1943) from roundwood. The pulp, as mentioned previously, was characteristically high in tearing strength but mediocre in other physical properties. Nevertheless, its strength properties were about equal to those of the commercial sample of southern kraft.

The experimental kraft pulps made from western hemlock and Pacific silver fir and also that from the mixture of equal weights of these two species had better strength properties, excepting resistance to tear, than the Douglas fir kraft pulp. In these experiments, most of the strength properties of the Pacific silver fir slightly exceeded those of the western hemlock; only the tearing resistance was slightly lower.

The bleachable pulps prepared by the longer cooking schedule are of noticeably higher purity and have lower bleach requirement than those cooked for the shorter period. The total cellulose contents of the pulps cooked by the shorter schedule averaged 95.1 per cent for all species and those for the longer period averaged 96.1 per cent. The average of the lignin contents of the pulps was decreased from 3.2 per cent to 2.0 per cent and that of the permanganate numbers from 16.8 to 14.0 per cent by the longer cooking schedule.

Certain of the strength properties of the bleachable sulphate pulps also can, to some extent, be correlated with the density of the wood. For example, tearing strength decreased with decrease in the order of the density of the four species and western red cedar having the

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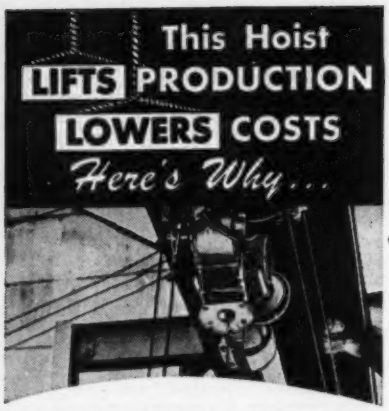

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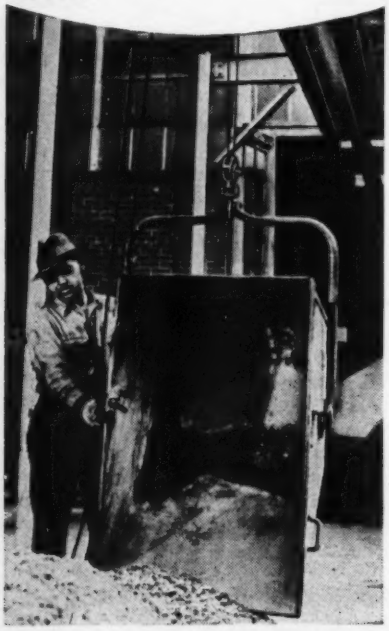

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lowest wood density produced pulps having the highest bursting, tensile, and folding strengths. However, under the more drastic cooking conditions employed for making the bleachable pulps, the physical properties of the pulps become more difficult to correlate with any property of the wood itself.

The experimental data obtained from the pulping of Douglas fir, western hemlock, Pacific silver fir, and western red cedar show that these four species can be cooked together without difficulty by the sulphate process and that logging and sawmill waste is suitable for the production of kraft and bleachable sulphate pulps of good quality. The kraft pulps obtained from all four species were at least the equal in strength to the sample of southern commercial kraft tested, with the possible exception of the low tensile strength of the Douglas fir kraft. The kraft pulps made from western hemlock and Pacific silver fir were superior in tearing strength and equal in other strength properties to that of a commercial kraft pulp made from a mixture of 80 per cent western hemlock and 20 per cent white fir. However, they were lower in bursting and tensile serength, and higher in tearing resistance than commercial northern kraft pulps made from jack pine and black spruce. Except for tearing resistance, the experimental western red cedar draft pulp was superior to any of the commercial northern, southern, or western kraft pulps tested. Confirming previous findings on Douglas fir, the kraft pulp made from this epecies was higher in tearing resistance but lower in most other strength properties than any of the commercial pulps listed.

The bleachable pulps retained considerable strength even though they were produced with a higher percentage of chemical. Again the bleachable sulphate pulp from western red cedar excelled those made from the other three species in all strength properties, except tearing resistance. As would be expected, the longer cooking schedule reduced the strength properties of the bleachable sulphate pulps, but not to such a degree as to render this method unfeasible should ultimate savings in bleach consumption and strength retained by fully bleached pulps warrant such a procedure. The strength characteristics of western red cedar and Douglas fir pulps suggest that proper blending of the fibers of these species should have excellent possibilities for the production of a kraft product of balanced physical properties.

Method for Locating Points of Gas Leakage in Packages and Packaging Materials

HANS H. HARTWIG

Central Manufacturing Engineering Dept.
Marathon Corporation

The method described in this paper has proved to be a useful tool in determining the exact location and degree of gas leakage through either flat sheets, bags, or completed packages. It is useful in identification of the operation which causes ruptures or leaks during conversion or package fabrication. Such identification permits reduction or elimination of the causes of package failure.

Apparatus

The materials required for this test method are as follows:

(1) Source of hydrogen sulphide; (2) rubber and glass tubing and stopcocks; (3) petri dishes of size to cover mouth of bag and shallow tray for mounting flat sheets; (4) microcrystalline wax; (5) water manometer; (6) 5% stannous chloride solution; (7) camel's hair brush; (8) trap with sodium hydroxide solution for effluent hydrogen sulphide; and (9) exhaust hood.

Procedure

A test coil is constructed with the material to be tested (a flat sheet, bag, or completed package can be used) by mounting the sample, using microcrystalline wax as a sealing medium, on a shallow tray, petri dish, or by sealing gas inlet and outlet tubes in the completed package with microcrystalline wax. Figure 1 shows a cell constructed with a bag, and Figure 2 shows a cell constructed with a flat sheet.

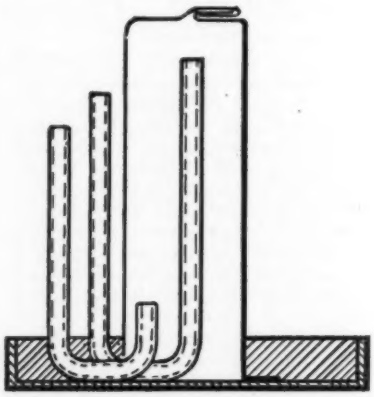

Figure 1

Certain simplifications will be obvious in specific cases, such as with a given size bag. The bag can be clamped over the end of a bottle from which the bottom has been removed. The hydrogen sulphide inlet and outlet tubes are fixed in the neck of the bottle with a rubber stopper.

The apparatus is simply constructed by connecting the cell between the source of hydrogen sulphide and the trap. The water manometer is attached to the cell. The cell is swept with hydrogen sulphide, and the stop cocks before and after the cell are adjusted to build up a positive pressure of 1 in. of water within the cell. The surface of the cell is quickly brushed or sprayed with 5% stannous chloride solution. The hydrogen sulphide reacts with the stannous chloride instantaneously to form brown stannous sulphide. If no brown stain appears, the hydrogen sulphide pressure is increased by increments of 1 in. of water until staining occurs or until 4 in. of pressure is reached. The cell is brushed with stannous chloride after each increase in pressure to insure immediate reaction. The increase in pressure by increments provides a method for differentiating between large and small ruptures. Pressures up to 4 in. of water

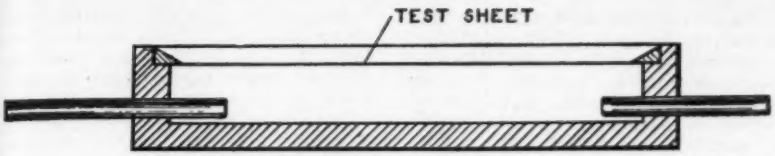

Figure 2

have been found sufficient in the work to date.

The hydrogen sulphide pressure is cut off, and the test cell is removed from the apparatus. The cell is swept with air, and excess stannous chloride is removed with water spray to prevent further staining.

A minimum of five samples is usually tested in order to minimize sampling error. The apparatus should be set up in an exhaust hood to remove escaping gas from the surface of the cell. This is not only a safety measure but prevents the hydrogen sulphide from staining a considerable surface area of the test cell.

Report

The size and density of the brown stain, location, rate of staining, and any other observation which will describe the condition of the test cell are recorded.

Acknowledgment

This work resulted from the joint efforts of D. W. Davis, Frederic Cherepow, August Schmidt, and the author.

Biochemical Oxygen Demand —a New Expression for the Papermaker

LOUISE E. McGRATH, President
Booth Chemical Co.

The course of the biochemical oxidation whether of the natural organic matter in the stream or of the pollutional load carried in from the mill proceeds in accordance with a definite law.

In 1932, Adeny stated the biochemical law as follows: "The quantities of oxygen consumed and of products formed on the completion of each stage of aerobic fermentation are constant for similar volumes of the same polluted water . . . provided that the dissolved oxygen be in excess of the fermenting matters." The biochemical oxygen demand is then a means of determining the amount of organic matter present in a sample of water by measuring the amount of dissolved oxygen used during the oxidation of the organic matter and can be expressed as the milligrams of oxygen per liter of water (ppm) (Phelps, E. B., *Stream Sanitation*, 1st Ed. New York, John Wiley & Sons, Inc., 1945) (Hoskins, J. K., *Sewage Works J.* 5, No. 6: 929, 1933).

For a more detailed review of the why of biochemical oxygen demand a study of the book "Stream Sanitation" by Earle B. Phelps, "Public Health Bulletin No. 173" by Emery J. Theriault, and the article "Oxygen Demand Test" by J. K. Hoskins in the November, 1933, issue of *Sewage Works Journal* is suggested.

Biochemical Oxygen demand (B.O.D.) can readily be determined by direct estimation of the dissolved oxygen contained in suitably prepared samples before and after incubation for a definite period of time (Phelps, E. B., *Stream Sanitation*, 1st Ed. New York, John Wiley & Sons, Inc., 1945) (Theriault, E. J., *Oxygen Demand of Polluted Water*, Public Health Bulletin No. 173, Washington, D. C., Government Printing Office, 1927) (American Public Health Association, "Standard Methods for the Examination of Water and Sewage," 9th Ed. Lancaster, Pa., Lancaster Press, Inc., 1946) (Ruchhoft, C. C., *Sewage Works J.* 13: 669, 1941) (Joint B.O.D. Committee, "Recommended Uniform Procedure for B.O.D." *Sewage Works J.* 4, No. 5, 1932) (Mohlman, F. W., Edwards, G. P., Swope, G., *Ind. Eng. Chem.* 20, 242-47, 1928) (Theriault, E. J., "Detailed Instruction for the Performance of the Dissolved Oxygen and Biochemical Oxygen Demand Tests." Public Health Reprint Supplement No. 90, Washington, D. C., Government Printing Office, 1931). The Ninth Edition of *Standard Methods for the Examination of Water and Sewage* recently published includes very detailed instructions for the determination of B.O.D. However, many questions have arisen when the technical man tries to use a method primarily designated for sewage on the effluent from a paper mill.

Needless to say, the time-honored precautions of eliminating air bubbles should be used in taking the samples. The glassware must be unusually clean. Glassware washed with soap and water and rinsed with alcohol or ether still holds some organic matter in the pores of the glass. Glassware carefully cleaned with chromic acid mixture is, therefore, essential. Tightly-stoppered glass bottles of 250- to 300-ml. capacity are recommended in Standard Methods. However, bottles of a different size may be used, but care should be taken to vary the proportion of reagents to the size of the bottle.

A controlled incubator or water bath accurate to within ±1 C. is necessary. Moisture present in the incubator is not enough (Conference: Dr. W. Rudolphs and associates, Rutgers University, New Brunswick, N. J., January, 1947). Water seals definitely should be used.

According to the authorities on the matter, biochemical oxidation, since it follows a law, behaves in an orderly manner during the course of the decomposition. The oxidation which occurs during the early period of incubation bears a relationship to the oxidation which occurs over longer periods of time.

Paper mill waste water is considered to be in the same bracket as strong domestic sewage. In determining the biochemical oxygen demand, therefore, provision must be made to present sufficient oxygen to the sample while being incubated to insure the oxidation of the organic material. The sample must be diluted, and it is in the

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Weyerhaeuser Everett Mill Adds Alternate Digester

Work has started on construction of a new digester of 18 tons air dry pulp capacity at the Everett, Wash., sulfite pulp mill of Weyerhaeuser Timber Co., which will be used as an alternate while each of the mills six existing digesters of similar capacity are being consecutively relined, Russell J. LeRoux, mill manager, has announced.

Stebbins Engineering Corp. of Seattle, which put in the original brick linings in 1936, when the mill was built, will put in the new linings, also of acid-resistant brick. This will be the first replacement of linings since the mill started up and the work should be completed by the end of 1948. The new digester is to be ready for use by about January 1.

Reprinted from Pulp and Paper Sept.-1947

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selection of the dilution water that some of the headaches of B.O.D. have arisen.

At first, aerated distilled water was used and then it was found that the copper which is frequently present in distilled water inhibited the growth of bacteria. Stored aerated river water into which the waste discharged was then used. Sodium bicarbonate was added to river water or added to distilled water in which the copper content did not exceed 0.01 ppm. Further work with dilution waters resulted in the development of "Formula C" water and eventually this was modified to include ammonium sulphate.

In the ninth edition of Standard Methods, one dilution water only is given which consists of using small quantities of chemicals dissolved in distilled water containing less than 0.01 ppm of copper and aerated. It is probable that within a short time in view of the new Standard Methods that the various authorities will recommend the Standard Methods dilution water.

The bacterial counts for paper mill waste water will vary not only in number but also in the kind of organisms. The count at one mill may be considerably higher than at another mill. Despite the fact that bacteria which act on cellulose are not necessarily found in domestic sewage, Standard Methods recommends that normal unfiltered domestic sewage be used for seeding, and this has been found satisfactory in the experience of Dr. Rudolphs and his associates of Rutgers University.

Paper mill waste water contains fiber, resins, starches, etc., which are readily oxidizable, but paper mill waste water may also contain toxic substances such as caustic, alkalinity, acid, or chlorinated substances which will inhibit the growth of bacteria in the B.O.D. determination. It is, therefore, necessary to remove these following the methods as outlined in Standard Methods. In the case of a waste water containing a large quantity of suspended matter, it has been suggested that B.O.D. be run on the sample as taken, as well as on the supernatant liquor of the settled sample. It has also been suggested that the samples be shaken about twice a day during the incubation period rather than rotating them during the entire 5-day period.

Some mills are using pentachlorphenates or mercury compounds as disinfectants. It is readily determined whether the quantity present will have a bactericidal effect by the B.O.D. results obtained. If the B.O.D. increases as the dilution increases it would appear that in the more concentrated form there is an inhibiting action on the bacteria. Since there are no methods for removing these substances dilution should be used in which the toxic effect is as small as possible.

The method of determining the dissolved oxygen in the diluted and incubated samples is by the time honored Winkler method with certain modifications. Supplement No. 90 to U. S. Public Health Reports (1931) gives the following short description of the Winkler process. The Winkler process for the determination of dissolved oxygen depends upon the formation of a precipitate of manganous hydroxide in a filled, glass-stoppered bottle. The oxygen dissolved in the water is absorbed by the manganous hydroxide forming a higher oxide of uncertain composition. This upon acidification in the presence of an iodide releases measured quantities of iodine equivalent to the oxygen content of the sample. The iodine is titrated with standard sodium thiosulphate solution.

However, there are certain substances which also interfere in this determination. The Rideal-Stewart modification which offsets the effect of ferrous iron is in use in some paper mills at this time but the trend seems to be that the Azide modification is more satisfactory unless large quantities of sulphites are present. Chlorinated compounds have been previously removed in the procedure for B.O.D.

It seems reasonable to expect that, because of the necessity for dilution in the B.O.D. procedure, the small quantity of fiber present will not interfere with the dissolved oxygen test. If it is suspected that the fiber does interfere, it can be removed by precipitation with alum before the dissolved oxygen test is run.

There are many ways of expressing the results obtained in the B.O.D. determination. Parts per million are satisfactory. It can also be reported as population equivalent or lb. of oxygen per ton of product. It must be borne in mind, however, that the determination of the biochemical oxygen demand is not a true chemical reaction following all the laws of molecular weights and volumes but is a process dependent upon living organisms which do not always behave in the same identical manner. The accuracy of the procedure is within 10 % unless one is a skilled research worker and if the results obtained check within 10% this also may be considered satisfactory (Conference: Dr. W. Rudolphs and associates, Rutgers University, New Brunswick, N. J., January, 1947).

The amount of organic matter present which is capable of being oxidized by living organisms is then a measure of how paper mill waste water will behave after it is discharged into a stream. If it contains too much organic matter for the normal oxygen content of the stream, it is to be expected that there will be an unfavorable effect on the life of the stream, and discoloration and odors may be expected.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC. REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of The Paper Industry and Paper World, published monthly at Chicago, Illinois, for October 1, 1947.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared A. Scott Dowd, who, having been duly sworn according to law, deposes and says that he is the business manager of THE PAPER INDUSTRY AND PAPER WORLD and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit.:

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(This information is required from daily publications only.)

A. SCOTT DOWD
(Signature of business manager.)

Sworn to and subscribed before me this 30th day of September, 1947.
[SEAL] THOMAS H. STEVENS, Notary Public
(My commission expires June 24, 1951.)

Postwar Developments With Emulsified Asphalt Sizing in Cylinder Boards

E. M. LORENZINI
Manager Bitusize Sales
American Bitumuls Co.

Use of emulsified asphalt for internal sizing is old art in the literature of papermaking, and the subject has been somewhat controversial, even to recent times. Earliest asphalt sizings were actually not emulsions but merely coarse dispersions

with nonuniform particle diameters greatly in excess of colloidal dimensions. Modern manufacture now supplies a uniform product, with particle size within the approximate limits of 1 to 4 microns. Specific treatments of the basic asphalt have led to improved operational stabilities in the usage of the emulsion on the paper machine.

The urgent war time requirement for highly sized container boards furnished the timely opportunity for the introduction of modern emulsified asphalt sizing. The first found features were particularly suited to the practical procurance of hard degrees of sizing in cylinder boards without the usual production penalties. The vast V-board program emancipated asphalt sizing from the old prejudices, and, after a somewhat slow start, it became an accepted sizing procedure in a short space of time.

The first of such V-boards made in quantity were run in 1942. This consisted of from three to five-ply solid fiber, employing both liner and filler components containing the somewhat startling amount of 10% asphalt size solids, based on the weight of fiber. Although arbitrary, it was a practical start which revealed some amazing results with regard both to test performance and economy benefits.

In the light of the specifications, sizing of V-board was interpreted largely surrounding high waterproofness, with high strength resistance to both the dry and wet abuses, expected in overseas war time shipping. The sudden introduction of the 24-hour immersion test was something new to the container board industry. Stress was laid on a high ratio of wet-to-dry bursting strength, which, from the viewpoint of board mill economics, required a proper operational balance between fiber furnish and production rates that were seriously affected by hard sizing. In this combination of factors, asphalt emulsion was quickly established but used principally in the category of high degrees of sizing.

It is not intended to review the supporting data that have been presented in earlier papers (Lorenzini, E. M., *Tech. Assoc. Papers* 28: 293-295, June, 1945; *Paper Trade J.* 120, No. 18: 39-41, May 3, 1945) (Lorenzini, E. M., *Tech. Assoc. Papers* 27: 342-344, June, 1944; *Paper Trade J.* 118, No. 21: 36-38, May 25, 1944). However, the following statement is significantly mentioned. Asphalt emulsion size offered the most practical and efficient solution for reaching V-2-S performance, employing cylinder boards that depended solely on internal sizing for their high degree of waterproofness. It was usual to see 24-hour immersion ratios of wet-to-dry bursting strength run in the neighborhood of 85 to 100% strength retention. It was soon learned that 10% asphalt solids rendered test performance in the finished board exceeding the specifications and usage in various mills finally settled at between 4 and 6% asphalt solids content for V-2-S components.

The V-board history has been mentioned only to establish the background of hard sizing which instituted the volume use of emulsified asphalt size.

The end of the war brought a change in the waterproofing needs of overseas containers. The enormous volume of weatherproof boxes was cut off sharply, and the activity remaining in peacetime overseas shipping containers has been gradually replaced with boards of lesser strength and lesser waterproofness.

For what can be called average present use for domestic purposes, the industry has settled on a range between 1 and 2% of asphalt solids, based on weight of fiber. It is interesting to know that this level of sizing was reached simultaneously through independent work in a number of unconnected mills working under various and different conditions.

The bulk of this newly developed sizing is represented in multicylinder containers and specialty boards, such as kraft and jute liner boards, chipboards, news lined wall board for gypsum plaster liners, and a number of high and low density structural and insulating boards.

Except for the liners, it may be perceived that in the categories named above there is not too much concern over final color of the boards. Such stocks show little if any discoloration when sized with low percentages of emulsified asphalt. Container boards of kraft, jute, and mixed furnishes, sized with from 5 to 10% asphalt solids took on a brown color, much like some grades of dark kraft. Even

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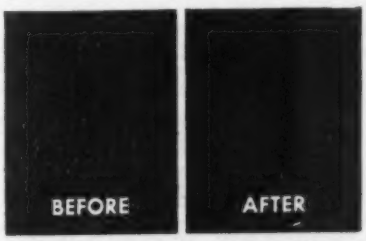

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higher contents in emulsified asphalt size do not result in a basically black color as the fineness and complete dispersion of the asphalt particles causes only a uniform stain, similar to a dye. However, as used at present, 1% of asphalt solids is not detectable in the average kraft liner. In reworked kraft liners the pale tint of brown resulting from 1 to 2% asphalt solids is in most cases beneficial in causing uniformity of color, tending to "balance up" irregularities of stock furnish. This type of liner sizing results in good smooth finish with good printing qualities.

In liner operations it will be recognized also that part of the sizing and the surface finish problem are critically tied to the stock refinement. In the various sized chipboards and specialties employed as fillers for solid fiber, color has little importance. In this category, asphalt size finds favor in boards that are to resist wet abuses, such as refrigeration, icings, etc.

Direct admixture of 1 to 2% asphalt size to light colored liner stocks will show perceptible discoloration. However, filler stocks employing up to 5% of asphalt solids can be successfully covered with normal, single web weights of top liner and preclude show-through of the treated filler stock.

Asphalt size is inexpensive, not alone on the basis of operational benefits, but also on the basis of pound to pound cost comparisons with other conventional sizing materials. The present low ranges of use (1 to 2%) may range in costs for applications at the beater from $1.00 to $2.00 per ton of finished board, for boards with throughout sizing. In cases where only top liners are sized, the same limits of use may run from $0.20 to $0.30 per ton of finished board. These figures are mentioned only to indicate a broad range of costs and do not include cost of alum.

Alum is required for precipitation and flocculing, and the requirement varies under differing mill conditions. Costs of alum required for asphalt sizing are about the same as for other types of sizings.

Abridgments in this section are from papers presented at the annual meeting of The American Pulp and Paper Mill Superintendents Association, held at the Edgewater Beach Hotel, Chicago, May 22, 23, and 24, 1947

Characteristics Desirable in Offset Papers

ROBERT F. REED, Research Director
Lithographic Technical Foundation

In order to appreciate the reasons why there are certain special requirements for offset papers, it is first necessary to know something of the principles and general operation of the offset lithographic process. Lithography is fundamentally different from other printing processes since the image areas on its printing plates are differentiated chemically rather than mechanically from the nonimage areas. The image and nonimage areas are essentially the same height and are not characterized by relief, as in letterpress, or by depression, as in gravure printing. Because of their essential levelness, lithographic plates are often referred to as "planographic" plates.

In order to print, the image areas of the lithographic plate must accept ink from the form rollers, and the nonprinting areas must reject it. The platemaking process consists in producing an ink-receptive printing image, usually by photographic means, and then treating the nonprinting areas chemically to make them water-receptive and ink rejecting.

The printing cycle, then, consists in first dampening the plate with water, second, inking the plate, and third, transferring the ink film from the image areas to paper, or, in the offset process, to the rubber blanket which in turn transfers it to paper.

Paper Requirements for Offset

At the present time, by far the majority of offset presses are sheet fed. The characteristics desirable in sheet stock will therefore be considered first. Since the offset press impression represents a uniform squeeze, the first requirement is that the paper be perfectly flat. Any variation from flatness produces distortion of the sheet as it passes through the impression nip. If a sheet has wavy edges, it will be distorted and compressed laterally toward the back edge, forming a wrinkle if the waviness is bad enough. In any case the back edge of the sheet will be under lateral compression when it receives the impression, and afterward it will relax so that the printed image, measured along the back edge, will be longer than the plate image. If, on the other hand, the sheet is tight edged, the opposite happens, the back edge being under tension as it receives the impression. The result is a short impression along the back edge.

Provided no wrinkling results, neither of these conditions is too serious in black and white work. In color work, however, it is quite serious since, in order to obtain register, exactly the same distortion must take place in printing each successive color. This is too much to expect when only one or two colors are printed at a time. The four-color press has an advantage in printing "unflat" paper, since changes between printings are largely eliminated. But even on the four-color press, the use of flat paper simplifies operations and increases production.

Wavy paper is produced when piles of dry paper are exposed to a relatively humid atmosphere. Under these conditions the edges of the sheets will take up moisture from the atmosphere and expand, particularly along the edges cut perpendicularly to the grain. The opposite condition, namely, contraction of the edges, or tight edge, is produced when piles of paper are exposed to a relatively dry atmosphere. The preservation of flatness in paper, therefore, requires mutual understanding and co-operation between the paper maker and the lithographer. To this end some lithographers have installed air conditioning, and some paper mills have equipped themselves to supply preconditioned paper, namely, paper that is

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delivered with the proper moisture content so that it will remain flat in the pressroom atmosphere in which it is to be used. This is the only rational solution of the problem.

When it is necessary to purchase paper that is not pre-conditioned, the well known practice of conditioning it in the pressroom must be resorted to. In the past this was usually done by hanging and blowing pressroom air through it. Investigations of paper characteristics, however, have shown that best results on the offset press are not obtained when dry paper is conditioned by this method. If the paper is on the moist side it works well. But dry paper should be conditioned to an atmosphere 5 to 10% higher in relative humidity than the pressroom atmosphere. This can best be accomplished by maintaining a separate paper storage and conditioning room at the higher humidity.

Air conditioning, as regards paper handling, means more than just maintaining a constant relative humidity. Temperature must also be kept within narrow limits. The reason is that paper changes temperature much more slowly than the atmosphere. A sudden rise in the pressroom temperature would create a demand for more atmospheric moisture, which would be supplied by an automatic humidifying system to maintain the same relative humidity. But the paper, remaining cool, would cool the air immediately surrounding it, thus raising the relative humidity. As a result, the edges of the sheets would take on more moisture and become wavy. A sudden drop in the pressroom temperature would have the opposite effect, namely, that of producing a tight-edge condition. Therefore, to keep paper in satisfactory printing shape, the air-conditioning system must keep both temperature and relative humidity constant day and night throughout the year.

Many lithographic plants cannot afford air conditioning and must resort to less effective methods of handling paper. In such shops the practice varies considerably, but the following routine is probably the best. The paper is first allowed to come to the pressroom temperature before being unwrapped. It is then immediately tested with the sword-type hygrometer. If it is in approximate moisture equilibrium with the atmosphere, it is run without being conditioned. If not, it is hung in lifts of 25 to 35 sheets and conditioned by forced air circulation until a test with the sword hygrometer shows that it has reached equilibrium. There is no possibility, of course, of conditioning it to 5 to 10% above the relative humidity of the pressroom. After conditioning, the paper should be kept covered with moisture-proof material to prevent its being affected by variations in the pressroom humidity.

The use of preconditioned paper in unconditioned pressrooms, while it does not eliminate the necessity for hanging, does have distinct advantages. It prevents the waviness which often develops in excessively dry paper, and which conditioning often fails to remove.

Curl is another factor that causes feeder and register troubles. Curl such as reel curl or set is inherent. It is the result of sheeting paper too close to the core of the reel. Since it is common practice to sheet several reels at a time, reel curl ordinarily occurs only in every fourth, fifth, or sixth sheet in the pile. Curl may also be caused by extreme dryness or non-uniform moisture distribution.

Structural curl is produced by excessive press moisture or by breaking of the sheet as a result of a tacky blanket or an excessively tacky ink. Excessive press moisture produces a temporary curl parallel to the grain direction of the paper. However, after sheets with this type of curl have lain in the delivery pile overnight and the moisture has permeated them completely, a new type of curl develops, usually across the grain, which is permanent and often troublesome. The only way it can be eliminated is to run the sheets through the press again using a blank plate to apply moisture to the reverse side.

All paper for offset should be trimmed with straight edges and square corners. A bowed gripper edge will not properly contact the front guides on the press. If the corners are not square, side register is affected. The worst feature of improper trimming, however, is that all sheets are never trimmed alike, and, as a result, repeated settings of the guides are necessary during the run. To avoid troubles of this type, the paper should be absolutely flat when trimmed, and the cutter knife should be sharp.

For use on web-offset presses, paper is, of course, supplied in rolls. In this form it is not subject to the same feeding and register troubles as sheeted paper. There is no across-the-grain edge exposed to the atmosphere to shrink or become wavy, and register does not depend on accuracy of trimming. And, since there is never more than one trip through the press regardless of the number of colors printed, there is no time for appreciable distortion or for expansion or shrinkage between colors. However, paper for web-offset printing must meet the same requirements as sheeted paper with regard to bond strength, ink-drying properties, and chemical action on the lithographic plate.

Picking and Splitting

Much has been written about picking and splitting of paper on the offset press. From the lithographer's standpoint these troubles are serious and necessitate frequent stops to wash up the press, thereby cutting down the life of plates. His only recourse is to reduce the tack of his ink excessively, an unsatisfactory remedy because it tends to cause emulsification and reduces intensity and snap.

There are various types of picking, all about equally detrimental to good work. In plain papers picking may involve only individual fibers loosely bound to the surface. The trade expressions for this are "linting" and "fuzz." The preventive lies in paper manufacture and involves either more hydration of the fibers or surface sizing.

Another type of picking of uncoated papers results in the lifting of clumps of

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fiber. In this case the trouble is due to lack of sufficient internal bond strength in the sheet. Again this is due to lack of hydration. Under extreme conditions large areas of the surface of the sheet may lift and stick to the blanket. This condition is referred to as "splitting."

In coated papers picking may take place in one of three ways: lifting of flakes from the surface of the coating, separation of the coating from the body stock, or splitting of the body stock itself. In the first case, the coating contains insufficient adhesive. In the second case, there may be sufficient adhesive to bond the pigment particles together, but, for some reason, the coating is not properly bonded to the body stock. In the third case, the internal bond strength of the body stock is insufficient to resist the pull of the ink.

The wax pick test is helpful in standardizing the pick resistance of any given stock, but the same pick numbers are not always indicative of the relative printing properties of different stocks. An improved testing method that would cover a much larger area than the wax pick test, and that would not involve heating the paper surface, would be very helpful.

The Ink-Drying Problem

Ink-drying troubles are still an important factor in limiting lithographic production. Part of these troubles could be avoided if ink-drying tests were made with the ink and paper to be used, prior to running each job. There is a traditional reason for not doing this. In the first place most shops make the pressman responsible for matching colors and adjusting the ink to the paper. In such cases the schedule does not allow sufficient time for carrying out the necessary tests. This difficulty can be overcome to a large extent if the plant maintains an ink department in which all inks are mixed and tested for color and drying in advance of the press run.

In many cases, drying trouble cannot be blamed on paper faults and variations. Paper is responsible for some drying troubles, however. Where its absorbency is not uniform over the entire area, or varies from sheet to sheet, drying will not be uniform. In coated papers, if the coating is too acid, drying is retarded, especially in humid weather. Coatings having pH values of 8.0 or more give the least trouble in this respect. There are, however, cases of retarded drying apparently caused by paper which are not now understood and which indicate the need for further research.

It is often necessary to substitute one paper for another apparently similar paper, and occasionally the results are disastrous to drying. In such cases the papers look and feel alike, but here the resemblance ends. Such substitutions should not be made without full knowledge of their effects on drying of the ink, or without mixing the ink differently for the new paper.

Ink absorbency of paper is an important factor in drying, but the absorbency requirements vary with the nature of the job to be printed. Paper to be spirit varnished, or for a job printed with gloss inks, must be much less absorbent than that intended for the regular run of work. At present there is no satisfactory absorbency test other than a practical printing test with the actual ink to be used.

Scumming and Tinting

Lithography depends upon the maintenance of two different surfaces on the printing plate. The surface of the printing area is rendered ink-receptive by a film of light-hardened colloid, or by the application of a hydrophobic lacquer or ink to the freshly cleaned metal. The nonprinting area is then treated with a hydrophilic colloid such as gum arabic which leaves an absorbed, water-receptive film to prevent ink from contacting the metal. Loss of this water-receptive film during printing results in scumming.

Lithography also depends on maintenance of a mutual antipathy between ink and water. Formation of a water-in-ink emulsion does no harm unless the percentage of water taken up by the ink becomes too great. But the formation of an ink-in-water emulsion is disastrous for obvious reasons. The slightest trace of ink-in-water emulsification produces tinting.

The water-receptive, protective film on the non-printing areas of the plate can easily be destroyed by abrasion or chemical action, either of which may have its origin in paper. If the paper contains pigment which is picked up by the blanket, the blanket surface becomes abrasive and destroys the plate's protective film. Or, if the paper is "fuzzy," or picks, it becomes necessary to wash up the plate frequently, and this damages the protective film. In making lithographic paper, the paper maker must compromise between two irreconcilable but desirable conditions. Bonding of fibers and filler retention are favored by a high degree of fiber hydration. On the other hand, dimensional stability and freedom from curl require that hydration be kept to a minimum. In order to secure the benefits of both conditions without their ill effects, many offset papers are surface sized. When the price consideration makes this impossible the balance is critical. Possibly the new technique of resin bonding now under investigation may alleviate this situation.

In the case of coated papers the coating adhesive must be fairly water-resistant. Otherwise the coating pigment will gradually transfer to the offset blanket and build up an abrasive film that quickly causes scumming.

The chemical effects of paper in destroying the gum film on lithographic plates are not too well understood. Excessive free alum in paper will cause scumming but much more is required than is usually present. Plain papers seldom have pH values below 5.0, and above this there seems to be no evidence of trouble. Coated papers, however, are often blamed for scumming troubles. The more alkaline coatings could destroy the plate protection, but their effects can usually be counteracted by increasing the acidity of the press fountain water. There is pretty good evidence that, with some coated stocks, the coating adhesive contains something that is water-soluble and acts as an emulsifying agent. This material gradually accumulates in the dampening water until enough is present to produce an ink-in-water emulsion. The result is a tint all over the blank areas of the plate, and nothing can be done about it. This condition has been known to occur even though no coating pigment whatever transferred to the blanket. It is a physical rather than a chemical problem and should be better understood by paper coaters. Everything that goes into paper coatings should be investigated with regard to final solubility, chemical action on zinc and aluminum plates, and surface activity.

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The continual demand for increased speed with less down time has accelerated the development of many detailed refinements in paper machines. These refinements pertain to the numerous large and small individual devices requiring power application throughout the machine. We have been energetically developing various units to meet this demand and for some time have been greatly impressed by the many operating advantages of compressed air.

Compressed air is very suitable as a power source, because it can be made to do useful work in several ways by providing for its expansion under controlled conditions. For example, when we expand air in a cylinder, we can obtain straight line motion. If air is allowed to expand in a motor, rotary motion can be obtained. If air is allowed to expand back of a diaphragm a considerable amount of force can be produced under conditions requiring little movement. Before we can use these air operated devices we must provide for their control in operation.

Compressed Air Controls

There is a complete series of units which provide for almost any type of air control or pressure regulation which may be required. Briefly, there are control valves which open or close ports, when hand operated. Other control valves may increase or decrease operating pressures. In addition, fixed-pressure regulators, relief valves, rotary air seals, pressure-operated switches and solenoid-operated valves are available for use on air control systems.

Air operated devices are usually very simple and rugged in construction. Materials used are not readily affected by water, oil, or heat. They can be used almost any place on the machine without damage due to corrosion. As a result of their simplicity, these devices are quite free from operating failures, and, in the event of failure, they are easily serviced by the regular maintenance men.

The complete assortment of controls and air operated devices has made it possible to provide positive control of heavy working units, with the minimum of effort on the part of the machine tender or his helpers.

Air-Operated Diaphragm

The air-operated diaphragm is probably one of the simplest types of units. The diaphragm has been used successfully for clutch operation, press loading, and oscillators where short travel is satisfactory.

The air-operated clutch can be used with single or multiple discs. The movement of the diaphragm will readily adjust itself to the travel required in the clutch, and no extra adjustment is necessary. The clutch is designed to reduce the transmission of heat from the friction surfaces to the diaphragm. As a result of the large effective area, diaphragm clutch operating pressures of 7 to 10 lb. are usually satisfactory. These low pressures result in very low stresses in the diaphragms. The rotary air seals which provide air to operating members are not overloaded at these low pressures.

By providing the proper control devices on the supply line to an air-operated clutch, it is possible to regulate the pressure built up and thus prevent rapid engagement.

Mechanical drive units using air clutches can be arranged to tie in with electric helper motor drives. When a machine equipped with helper motors is to be started up, the motors are energized before the air clutch is engaged. In the event of a failure of the electric supply circuit, the air clutch is immediately disengaged. This kind of protection on a helper drive will avoid damage to felts, wires, rubber-covered rolls, or mechanical drive parts on the installation.

The use of air clutches readily lends itself to operation with air brakes. Air brakes are used on drives for large dryer sections, where the inertia of a high-speed machine with anti-friction bearings may permit operation for some period of time after the clutch is disengaged.

Another interesting application using air clutches is on calender stack drives. A control valve may be operated to admit air to the main clutch for driving the calendar stack in the forward direction. When it is necessary to reverse the stack, the control valve can be shifted to another position which cuts off the supply of air to the main clutch and admits air to the clutch on the back-up motor drive.

A low output-speed gear-head reversible motor is arranged to drive the calender stack slowly, either in the forward or in the reverse direction.

A level control located in a convenient position is all the machine tender needs to disengage the main calender clutch and to engage the reversing drive. The down time to get a plug out of a stack is therefore greatly reduced, and the job is much safer to handle.

Press roll loading by means of air operated diaphragms is another very important development. A simple lever is used to multiply the diaphragm force to load the roll. Both front and back ends of the press roll can be loaded from one operating valve. This loading can be identical, or if pressure regulators are provided, different pressures may be secured on the front and back sides as required.

Diaphragm operated presses are open and very accessible. The simple lever and diaphragm mechanism greatly reduces internal friction which avoids variation in operation. The compressability of air provides a cushion effect which is very desirable. Air control permits accurate loading and rapid adjustment.

Air Operated Cylinders

Both single- and double-acting air cylinders are used extensively on paper machines. They are simple in construction and are very easy to maintain in good operating condition. One of the most successful developments using air cylinders is the automatic air guide. The front end of the guide roll floats on air. A Witham head on the roll actuates a small slide

Easily rolled to any part of your plant, these 3 cu. yd. tilt type bodies speed production and cut handling costs on raw materials, finished products or waste. Any number of these or other type bodies can be handled, from your loading platform, by one Dempster-Dumpster truck hoisting unit. As shown here, loaded bodies are rolled to loading points, picked up, hauled, dumped and returned . . . a continuous cycle of operation. Standard or special bodies in 1½ to 10 cu. yd. capacity are built to handle any type of material. Cost of installing is surprisingly low. Write for catalog 247 today.

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valve which admits air to the cylinder on which the guide roll is supported. There are no palms, ratchets, or continually-operating cranks on this type of guide. Since the Witham head operates a very light mechanism it is sensitive to slight variations in felt position. The result is a guide which is very easy on the felt and one which requires very little service. The guide operates smoothly, and it does not hunt.

Double-acting air-operated pistons are also used extensively in connection with the operation of the center wind reels and board reels.

On a board reel double-acting cylinders are mounted in a vertical position with their lower ends engaging roller levers to hold down the reel spool when it is rolling on top of the drum. Pressure can thus be applied to prevent jumping when a new roll is started. The pistons can recede automatically as the roll of paper increases in size.

After transfer from the primary arms to the incline table a set of double acting pistons provide pressure against the reel spool journals. The hardness of the roll is again controlled by pushing it against the reel drum. Air gauges on the supply lines accurately indicate the pressures provided. The operator can conveniently change the pressure setting to suit the type of sheet or board being run.

Where several air controls are used on a reel they are usually arranged on a single panel permitting fast, convenient operation with a minimum of broke.

Double-acting air cylinders are used to provide the reciprocating motion required to drive oscillating doctors and oscillating showers. The device is simple in construction and positive in operation. There are relatively few wearing parts. Air cylinders are also used on winder shaft transfer equipment, rider roll lifts, winder shaft lifts, winder gate lifts, and winder sheet threaders.

Air Operated Motors

Air motors provide a convenient source of power for various load conditions, such as:

1. Intermittent drives which must have a high starting torque which can be regulated.

2. Drives which must be frequently or rapidly reversed with close travel limits.

3. Drives which must move heavy loads very slowly under positive control.

4. Drives which may be stalled for long periods.

Air motors are available with either high-speed output shafts or with enclosed gear reduction. These motors are readily reversible by changing the air inlet from one port to another. They are also useful in applications where the air motor is detachable and can be placed in position for driving only when required.

The amount of power available to start a given load can be greatly increased by merely increasing the air pressure supplied to the air motor. The speed of the motor can be controlled through direct manipulation of the control valve by the operator. Following are several typical applications which clearly bring out the operating conditions on which the air motor drive is an ideal application.

On removable fourdrinier machines it is necessary to swing the breast roll back in order to provide ample slack in the wire. The breast roll supporting arms have gear segments which can be used to lower the roll or raise it as required. A removable air motor is used to provide the power necessary to lift or lower the roll.

Air motors are used on fourdrinier remover drives. The motor is mounted directly on the fourdrinier frame. Flexible connections are used on the air supply hose which may be disconnected when the drive is not required. The control valves are mounted adjacent to the motor so that the operator can start the motor and drive the fourdrinier across the aisle under his complete control.

On high speed machines of considerable width the main slice becomes very large and heavy. This slice must be operated up or down very slowly and under positive control in order to stop it in exactly the correct position. These slices are provided with vertical lift screws which are driven through worm gear reducers. These reducers are driven by a reversible air motor. It is therefore possible for the operator to inch the slice down into position exactly as required.

The stock flow to the machine is controlled with large flow regulating valves located in the stock supply pipes. These valves may be opened or closed by driving the valve stem with an air motor. Suitable gear reduction is provided in order to secure slow speed operation. No special devices are required to limit travel in either direction.

The control valves for operating the slice lift and the stream flow valves can be located together in some convenient position on the machine floor. This saves time and gives the machine tender the best opportunity to regulate the stock flow to the wire.

Air motors are also used to drive felt stretchers, belt shifters, and press roll lifts. They may be operated from a central control point or from a point near the drive motor.

There are many other special devices that have been used successfully on paper machines.

All of these air-operated devices lend themselves to convenient and positive control by the machine operator and, therefore, their use will be reflected in safer and more continuous machine operation.

Report on the Commercial Production of High Yield Sulphite and Sulphate Pulps

DOUGLAS G. SUTHERLAND
Sutherland Refiner Corp.

A 48-in. Sutherland refiner was placed in operation in the production of high yield sulphite in 1936. This sulphite was used in newsprint papers. A paper covering this subject was delivered before the Canadian Technical Section in January, 1937, by Dr. H. W. Rowley. Nothing can be added to Dr. Rowley's paper except to say that commercial operations produced a yield of 63%. Economic conditions have been such that this system has not been widely adopted. However, equipment is now being produced to complete additional installations. There have been some objections to the dirt count in high yield sulphite, but this can readily be overcome by the use of dirt removal equipment which is now available to the industry.

After the successful installation on sulphite, Mr. D. Manson Sutherland initiated some discussions as to the possibilities of installing a similar system in a sulphate mill. In 1937, Sutherland refiners were installed between the blow tank and washers in a southern kraft mill. Some interesting results were obtained. Washing improved somewhat with a tighter mat on the vacuum washers without any knots being present. At the same time, some changes in the character of the stock were noted in the paper mill. However, the tests could not be continued because of the presence of large quantities of tramp metal in the pulp which seriously damaged the stainless steel refiner discs. Lack of consistency control, also, contributed to poor refiner operations. Wide variations in consistency caused fluctuations in refiner operating conditions preventing the continuous production of a uniform quality pulp. Conditions were such in the mill at that time that provisions could not be made to adequately remove tramp metals or control consistency; consequently, the tests were abandoned without proving the advantages or disadvantages of the system.

However, it was felt that there were sufficient interesting signs to warrant further trials. The war years interfered with the resumption of this work until 1945. At this time an opportunity arose to install two Sutherland refiners in the pulp mill of the Bathurst Power & Paper Company, Ltd., for the production of high yield sulphate. In 1946 an additional refiner was added bringing the total to three 48 in. units. A report on the progress made in this mill was given in January, 1947, at the Montreal Convention of the Canadian Technical Section by Mr. Gordon F. Allo, control superintendent of the Bathurst Power & Paper Co., Ltd., in a paper entitled, "Kraft Brown Stock Refining at Bathurst Power & Paper Company Mill." This paper covers the period up to December, 1946. Another paper by D. Manson Sutherland, president of the Sutherland Refiner Corporation, titled "Progress Report on Continuous Refining of High Yield Pulp at High Temperatures and Alkalinity" was presented before TAPPI in February, 1946. Since that time, additional information has been gathered and is included in this paper.

The major change in the mechanical equipment necessary to produce high yield sulphate is the installation of Sutherland Refiners between the blow tank and washers in the pulp mill. Other equipment necessary to maintain and operate the system successfully is a magnetic separator and adequate consistency control.

Pulp is prepared in conventional digesters either rotating or stationary. It is blown into a vertical blow-tank which is equipped with agitation. Pulp is diluted around the area of the agitator with black liquor from the washers. A Foxboro con-

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sistency regulator operating a Stabilflo valve controls the consistency of an average of 3.25%. Temperature of the pulp leaving the blow-tank is approximately 175 Fahr.

Pulp is drawn from the blow-tank near the top of the bottom cone permitting heavy metal particles to settle to the bottom of the cone for later removal.

The stock is then pumped through a settling box equipped with a magnetic separator.

Leaving the magnet the pulp enters a header over the refiners. From this point a valve controls the flow to each refiner. A line returns excess stock from the header to the blow tank. This line is used to regulate the pulp pressure in the header to the point desired by the refiner operators. During the past year inlet pressures to the refiners have been gradually reduced until today 48 in. diameter discs operate at approximately 10 lb./sq. in.

The three Sutherland refiners are installed so that each refiner passes one third of the volume of stock. Refiners are controlled to produce the desired pulp quality by varying refiner setting and inlet pulp pressures. Refiners equipped with 48 in. discs produce in excess of 100 tons per day; 42-in. refiners have a maximum production of approximately 80 tons per day. Power consumption is approximately 2 hp.-days per ton.

From this point on, the system is conventional with the exception that no knotters are required. The pulp is washed in a continuous system using vacuum washers. It is interesting to note that on these washers efficiency has improved slightly since the refiners were added. From the washers the pulp goes through screens, over deckers, and then through additional Sutherland refiners directly behind the paper machine.

An average daily production of 240 tons is turned out of four digesters. Chips are not packed, but the digesters are topped off with chips before the cover is bolted on. Heating is with direct steam through nozzles in the bottom cone. Cooking has been manually controlled, but in the near future, fully automatic controls will be installed.

When the brown stock refiners were installed, gradual changes were made in the cooks. The degree of hardness of the pulp was gradually increased by reducing the charge of alkali and shortening the cooking time. Over a period of several months, the cooking time was reduced to a low of 2 hr. 25 min. steam to blow. Active alkali as Na_2O has been reduced to 450 lb. per ton of pulp. This cook results in a chlorine number of 13 to 14. The mill operated for several months with pulp cooked to this chlorine number. More recently the active alkali as Na_2O has been further reduced to 425 lb. per ton with a cooking time of averaging 2 hr. 25 min. steam to blow. This cook results in a chlorine number of 15-16. The yield is approximately 62-63% B D pulp from B D wood.

Experimental cooks have been made which had a chlorine number of 19-20. Insufficient work has been done at chlorine numbers of 19-20 to give accurate data as to quality of pulp. Additional work will be done in the high chlorine numbered pulp and the results reported at a later date.

Pulp sampled at the deckers has the following characteristics:

Chlorine Number	14.0
Freeness	718 Canadian Standard
Mullen	83%
Tear	254%
Breaking length (meters)	6120
Stretch	2.7%
Screen rejects on .006 in. cut screen	2.8%

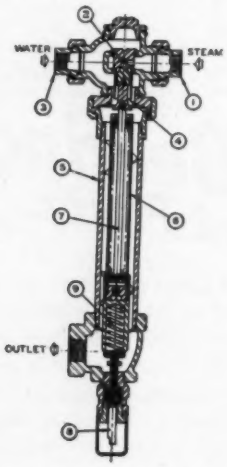
Savings possible in mills using high yield pulps can readily be calculated. Pulp cooked to a chlorine number of 12-13 will have a yield of approximately 58%—an increase in yield of from 18-20% over normal operators. The savings in wood will be approximately $5.00 per ton of pulp at present wood prices. Reduction in steam and chemical consumption will result in additional savings of from $0.50 to $1.00 per ton of pulp giving an overall savings of $5.50 to $6.00 a ton. Higher yields will have corresponding increase in the savings per ton of pulp.

Experimental work is being done towards the use of high yield pulps for high test bleached and unbleached papers. The results so far indicate that there are few grades in which high yields cannot be used.

NEW EQUIPMENT AND SUPPLIES

Steam and Water Mixer

Sarco Co., 475 Fifth Ave., New York 17, N. Y., has announced a steam and water mixer (26 in. long and 5 in. wide at the head) for tapping in on both a water and a steam line (steam pressure must be 20% higher than water pressure, and maximum steam pressure is 125 psi gauge.). Entire construction is brass with renewable valve heads and seats of stainless steel. A union connection is provided on both the steam and the water inlet.



The manufacturer cites a hot water capacity of 200 gallons per hour with a steam pressure of 75 psi and a temperature rise of from 50 deg. to 120 Fahr.

Operation (see accompanying illustration) is as follows:

Steam enters at 1 and goes through valve 2. Cold water enters at 3 and mixes with the steam in injection chamber 4. The resulting mixture of hot water enters housing 5, flows over thermostat 6. When hot water flows over thermostat, liquid within it expands and gradually pushes forward plunger 7 to close valve 2 and to cut off steam at temperature set at 8 by key furnished.

Body 5 then cools by radiation, liquid in thermostat 6 contracts and plunger head 7 opens valve 2. In operation, a balance is secured which holds valve open just sufficiently long to maintain the desired temperature. Relief spring 9 prevents damage from accidental overheating.

Allyl Starch

General Mills Research Laboratories, Minneapolis, Minn., according to an announcement, are now offering pint, quart and gallon samples of allyl starch for evaluation by interested companies. This product, possibly valuable in paper impregnation and grease-proofing and in laminating processes, is an unsaturated ether of starch which contains approximately 1.7 allyl groups per glucose unit. It is soluble in many organic solvents, including alcohols, ketones, esters, halogenated hydrocarbons, nitroparaffins, ethers, benzene and in other aromatic hydrocarbons providing a hydrogen bond-forming solvent is also present. It must contain a plasticizer before it can serve as a satisfactory coating because in contact with air, it polymerizes into a hard brittle film. It is incompatible with drying oils and most cellulose derivatives.

Application can be by brush or spray from 40 to 50% solutions.

Samples are offered in three solvents: benzene, lacquer solvent, and 95% xylene—5% insobutanol. All light amber in color and neutral in *pH*, these solutions are stable and may be stored without danger of gelation.

Squirrel-Cage Induction Motor

Electric Machinery Mfg. Co., Minneapolis 13, Minn. has announced a two-pole squirrel-cage induction motor as an addition to its "Heavy Duty" line. Rated

from 200 to 700 hp. at 3600 rpm, the motor (NEMA Class B starting—normal torque, low current) is favorable for across-the-line starting. It is of drip-proof construction with a fabricated steel frame.

Combination Metal Spray and Welder Unit

Wall Colmonoy Corp, 19345 John R St., Detroit 3, Mich., has announced the Colmonoy Spraywelder as a device for combining metallizing and welding procedures. In doing a job, the unit is first operated as a powdered metallizing unit to

apply a sprayed overlay of the powdered composition to the base metal; and then it is used as a conventional welding torch to fuse or bond this overlay to the base metal. According to the manufacturer, the fusion or bond thus made is identical to that obtained when the same alloy in rod form is applied by acetylene welding.

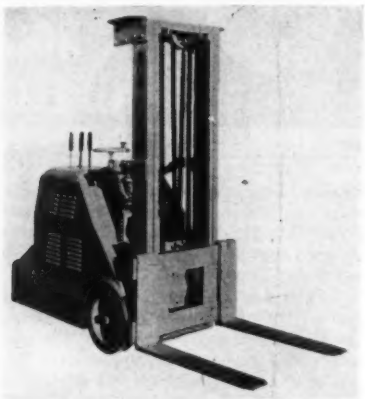
The unit consists of a gun with necessary hoses and connections. The gun may be hand-operated or held in a vise or with an attachment in the tool post of a lathe.

There are only two control valves, both of them mounted on the gun itself. A hopper for the powdered metal and the carburetor are combined in a single unit. Once adjusted the powder flow may be stopped and started at will by pressing or releasing the trigger.

A panel is provided for holding all the equipment.

Lift Truck of 3,000 Pound Capacity

General Equipment Company, 835 S. E. Main St., Portland 17, Oregon, has announced a lift truck (Model F, *Mobilift*) with a rated capacity of 3000 pounds on a 15 in. load center. Weighing approximately 4450 pounds, this truck requires no gear shifting, and has an overall turning radius of only 61 in. It is equipped with



a 20 hp three cylinder air-cooled engine, and with a roller chain lift for a lifting height of either 68 or 108 inches (underside of load).

Tube Winder in Both Single and Double Belt Design

Samuel M. Langston Co., Camden, N. J., has announced a tube winder, the "WK," which will handle diameters from ⅛ in. to 13 in., and which can be built to wind large diameter drums, or pails, on special order. Built on a box section of welded construction, the winder, either single or double belt, uses roller and ball bearings throughout.

A d-c variable speed motor, of appropriate horsepower for the job required, is mounted under one winding pulley and is directly geared to the pulley shaft. A manually operated rheostat is used for speed control.

The drive (patent applied for) is of particular importance on the double belt machine. Each pair of pulley is driven by an independent variable speed motor.

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Too often, process lines are the weakest link in the paper-making cycle—a condition that is readily understood by mill men who are endlessly shutting down or closing stock, white water or liquor lines for repairs.

Trentweld stainless steel tube (type 304) eliminates this irritating and constantly re-occurring expense, because Trentweld tube is highly resistant to erosion and corrosion. While it does cost more initially, this increase is picked up over and over again in the disappearance of line failures and wasteful shut downs. In addition, Trentweld tube is easy to work with. It is light in weight, simple to handle and install. Yet it is rigid, very strong and able to withstand repeated heating and cooling, including a high resistance to thermal shock.

These advantages are being built right into the new Champion mill at Houston, Texas. Why not consider them for your plant—as replacement pipe or wholly new line. Without obligation write Dept. 17— or send for the Trentweld Data Bulletin.

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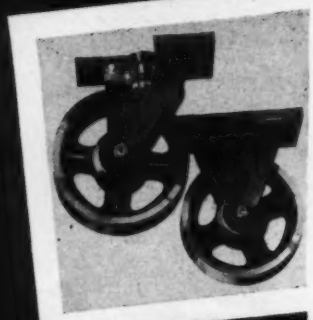

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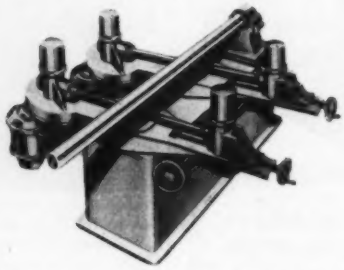
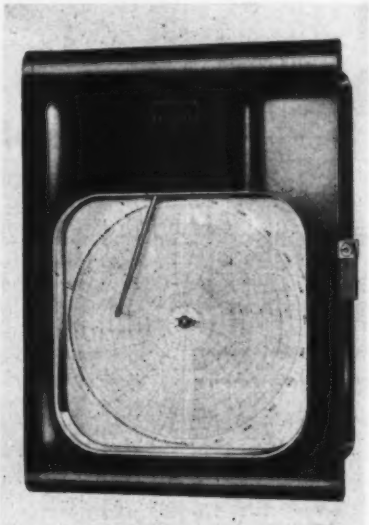
Speed relationship between the two motors can be adjusted readily to compensate for the differences in diameter of tube under the tube winding belt. The arrangement insures against any slippage of the belt over the paper.



Construction of the single belt machine is such that it can be converted into a double belt machine to wind heavy cones up to 21 plies. An additional box section, mounting the second set of winding pulleys and drive, can be added at any time to the single belt machine.

New Line of Recording Thermometers and Gauges

A new line of recording thermometers and recording gauges, known as Series 500, has been announced by The Bristol Co., Waterbury 91, Conn. Furnished in 18-in. and 12-in. sizes in a wide variety of ranges, this line incorporates a number of design improvements to make the instruments easier to use, more convenient to service, and readily convertible from one type to another.



Pen arms of an instrument are pivoted on stainless steel journals with the pen arm shaft supported at both ends in a rigid one-piece mounting. The journals are ground and polished to provide low-friction action. Link members between the measuring element and pen-arm mechanism are removable without tools and can be equipped with over-range and under-range two-way springs when required.

The case is designed so it can be mounted either on a wall, front of panel, or flush on a panel, and can be converted by user from one type of mounting to another. Other case features include a heavy inlaid sponge-rubber door gasket, flush roll-type door handles and nonprojecting door hinges.

The mounting block, which holds the external connection to the instrument, is removable. It can be mounted either on the bottom or back of case and can be changed at the discretion of user from bottom to back of case or vice versa. Also, it is designed for easy removal of the measuring element system.

Lightweight Blower

Bryant Heater Co. (Industrial Division), 1020 London Road, Cleveland 10, Ohio, has announced a lightweight blower, the *Hi-Flo*, which has been designed for constant pressure output over a broad capacity range. The housing, base and side plates of the blower are of aluminum; the impeller is of steel. Other features include flanged outlet connection, three-point mounting base and hub arrangement to permit use of standard 3450 rpm motor with regular shaft extension.

Although normally supplied for clockwise rotation, the entire unit may be reversed without special tools.

The blower is available in size (outlet pipe) range from 2 in. to 6 in., supplying 100 to 525 cfm. in the 4 oz. classification, and in 2 in. and 3 in. outlet sizes, furnishing 125 cfm. at 18 oz., and 275 cfm. at 16 oz., respectively. Powering motors range from 1/3 to 2 hp.

Lime-Soda Water Softener

A new design of hot lime-soda water softener for softening boiler feedwater has been announced by Liquid Conditioning Corp., 114 East Price St., Linden, N. J. The equipment, made in five types to cover wide range of plant conditions and requirements and known as the Liquon Hot Lime-Soda Softener, has a deep sludge bed or blanket through which the raw water percolates upwardly. Each type includes provisions for chemical feed, vent condenser, filters with backwashing water recovery (so that wash water does not pass through or disturb sludge bed in softener), and special automatic desludging valve which controls the depth of the sludge bed.

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Printability of Coated Papers

This paper describes several procedures for evaluating the relative printing qualities of different inks on the same paper and of the same ink on different papers. In one of the tests the paper is printed with a flat copper plate in solid black. Ink consumption is measured by weighing the plate before and after the printing. Blackness of the printed surface is measured photometrically by comparison of the reflectance of the printed and unprinted surfaces. Penetration of the inks is measured by determining the blackness of the under side of the printed surface. The relative efficiency or compatability of a given paper-ink combination can be measured by plotting the ink consumption versus the blackness and observing the strike-in. The quality of tone reproduction is evaluated by printing the paper with a plate bearing a wedge of grays superimposed with a scale of opaque lines. The last visible scale line is a measure of the contrast. Bekk, J., *Textil-Rundschau* 1, No. 3, 75-78 (1946) (In German) (Through Bull. Inst. Paper Chem. 17, No. 12, 717-718, 1947).

Analytical Filter Papers

Extensive tests on both domestic and foreign analytical filter papers have been made at the Bureau of Standards for the purpose of establishing recommended standards of quality for these materials. The tests made included alpha cellulose, copper number, ash, wet bursting strength, basis weight, caliper, density, retentivity of barium sulphate precipitate, and time of flow for water. One of the principal factors in determining filter paper quality is the state of degradation of the cellulose in the paper, as reflected by the alpha cellulose content and the copper number. Advanced degradation of the cellulose leds to rapid deterioration of the paper in storage and may render it unfit for use after relatively short periods of time. Degraded cellulose materials may effect analytical results through the reducing action of degradation products washed through the paper or through the colors developed in the case of colorimetric analyses. Ash contents, acidity, retentivity of barium sulphate and time of flow of the papers tested were satisfactory when the papers were used for the purpose intended. Tentatively suggested specifications are: alpha cellulose not less than 95%, copper number not more than 0.5, pH value of not less than 6, ash content of not more than 0.1 mg. of ash in an 11 cm. circle for quantitative papers and 1.0 mg. for qualitative papers. Suggested times of flow of water by a Bureau of Standards test are 20 seconds for coarse papers, 40 seconds for papers for medium precipitates and 85 and 150 seconds for unwashed and acid papers for fine precipitates, respectively. A minimum wet bursting strength of 3 or preferably 4 points is suggested. Bordon W. Scribner and William K. Wilson. Journal of Research of the National Bureau of Standards, 39, No. 1, 21-27 (Research Paper RP1809) (1947).

Optical Properties of Paper

The first part of this article is devoted to a theoretical discussion of optical phenomena, definitions of terms and laws, and descriptions of instruments used to measure the optical properties of paper such as opacity, color, brightness, etc. A description is given of a special instrument constructed by the authors for use in this study, which was principally concerned with the action of opacifying materials in paper. Fillers are effective in opacifying paper because they increase the surfaces which are capable of scattering light, these consisting of filler-air and fiber-air interfaces. Curves are given showing the relationship of transparency to filler content for most of the common loading materials and for a number of different fiber furnishes. The decrease in transparency with increasing filler content was greatest for a partially bleached sulphite fiber furnish. The light absorption of aqueous suspensions of the fillers is a function of the filler concentration, following neither Lambert's nor Beers' laws, and the opacity of the suspension did not correlate with the opacifying power of the filler when used in paper. Specific surface, particle size distribution and reflectance studies of the fillers were made. It was pointed out that a filler of low reflectance relative to that of the fibers to which it is added may actually increase the reflectance of the filled sheet because of the greatly increased fiber-air interfaces in the loaded sheet, and it is possible for the reflectance of the sheet of paper to pass through a maximum value as the amount of filler is increased. H. Gaegauf and M. Müller, *Textil-Rundschau* 2, No. 6, 222-229; No. 7, 258-265 (1947) (In German) (Through Bull. Inst. Paper Chem. 18, No. 1, 31-32, 1947).

New Methods for Moisture Determination

Time saving methods for moisture determinations have been the subject of many recent studies. One of the more ingeneous of the newer methods which have been evolved depends upon the difference in dissociation of an electrolyte, such as oxalic acid, in aqueous and in nonaqueous solvents. The material is extracted with a measured amount of a nonaqueous solvent of low electrical conductivity containing up to 10% of the electrolyte. As the solvent removes the water from the sample, the dissociation of the electrolyte increases and this dissociation is measured by electrical conductivity. A calibration curve of conductivity versus water content of the solvent is constructed and may be used over a wide range of materials. Methyl and ethyl alcohol may be used as solvents, but the author particularly recommends acetone, because of the slight solubility of sodium chloride, which is present in many materials, in this solvent. A single, closed vessel made of ceramic or glass ware and containing both the extractor and conductivity cell may be used for the determination. The extraction is complete in from one to two hours. J. Boeke. *Phillips Technical Review* 9, No. 1, 13-15 (1947). (Through Bull. Inst. Paper Chem. 17, No. 11, 641, 1947).

A second recently announced method for moisture determinations utilizes a special balance upon the pan of which the material is dried by infrared radiation. The balance is constructed to read directly the percentage of moisture at equilibrium when a five gram sample is used. Radiation is accomplished through the use of a projector lamp operated at reduced voltages, and a special rhodium plated reflector, which gives a beam of uniform intensity across the sample. It is claimed that most materials are dried completely in up to 12 minutes without raising their temperature to 100 C. Barrington R. Brock. *Chemistry and Industry*, No. 22, 299-302 (May 31, 1947) (Through Bull. Inst. Paper Chem. 17, No. 11, 641, 1947)

An electronic instrument for moisture determination has been announced, based upon principles established by L. Hartshawn and W. Wilson. The instrument measures both conductance and capacitance and indicates presence of free moisture and moisture held in suspension in the material. Special electrodes may be built to measure moisture of paper in sheet or in bulk, and possibly on the paper machine. Leslie G. Toplis, *Paper Maker*, 113, International number, 36 (1947).

Sulphite Waste Liquor Analysis

A rapid method has been developed for the determination of sulphates in sulphite waste liquor. The analysis takes about 20 min. and can be used for control purposes. The method applies in sulphite waste liquor processing, such as oxidation, evaporation, etc. Errors that are caused by the oxidation of sulphites are minimized as are those due to absorbtion of impurities on the precipitated barium sulphate. Thus the authors were able to obtain results which were more accurate than those resulting from the use of other procedures. Briefly, the method involves cation exchange to replace calcium or magnesium with sodium, followed by a conductometric titration of the highly diluted sodium base liquor in 50% isopropyl alcohol solution, using a standardized barium chloride solution as a titrating agent. By the addition of formaldehyde prior to the titration, sulphite interference is eliminated. The conductivity apparatus is available and relatively inexpensive. Q. P. Peniston, Vincent F. Felicetta, and J. L. McCarthy. *Analytical Chemistry* 19, No. 5, 332-4 (May, 1947).

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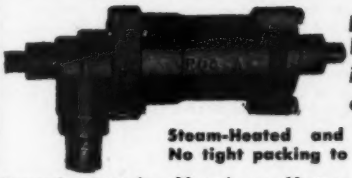

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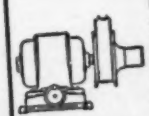

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New Catalogues and Publications

Cochrane Corporation, 17th and Allegheny Ave., Philadelphia 32, Pa.—Released by this company is a 16-page booklet, No. 4410, describing five different flash-tank and heat exchanger systems for recovering the otherwise wasted heat in boiler blowoff water. A quick-estimating chart is provided, together with roughly estimated cost of equipment. Two thermostatically controlled systems are described and illustrated. Also announced by this company is a new edition of its 12-page bulletin which describes steam purification units for removal of moisture and solids in steam lines. Application data, hook-up diagrams, installation photographs and necessary descriptions are included in the booklet. Cochrane Steam Purifiers, Publication 2725. A third new publication is a 20-page manual on the greensand zeolite softening process, which may be applied to boiler feeds. Three pages are given to the chemistry of the process, including softening, backwashing, brining, rinsing and complete regeneration process. Cutaway views are used to show the operation of the equipment. Installation arrangements are shown by line diagrams, wash drawings and photographs. A two-page table of dimensions, weights and list prices is also included. Ask for publication 4345.

Klipfel Manufacturing Company, Hamilton, Ohio—Of particular interest to the pulp and paper industry is Catalogue No. 344, available from this company, describing in detail their various types of float valves for constant liquid level control. The bulletin is well illustrated and includes tables showing prices, weights and dimensions. Also available are Bulletin No. 146, Reducing Valves; No. 443, Thermostatic Valves, and No. 644, Back Pressure and Relief Valves.

Link-Belt Company, 307 N. Michigan Ave., Chicago, Ill.—Now available from the Link-Belt Company, at 2045 W. Hunting Park Ave., Philadelphia, or any branch office, is a new booklet, 1819, 68 pages, describing enclosed herringbone gear units for speed reducing and increasing. Engineering information includes reducer selection data and examples of proper application; dimensions and horsepower ratings; lubrication data; and tables of maximum allowable pull on high and low speed shafts. Photographs of installations are included. Also available from the Link-Belt Company at 2410 W. 18th, Chicago 8, or from any branch office, is a new catalogue on their ball-bearing overhead trolley. The eight-page illustrated folder, No. 2241, gives dimensions, weights, trolley ratings, allowable chain pulls, list prices and other data for selection of the proper trolley.

Norton Company, Worcester 6, Mass.—An attractive and informative bulletin now available from this company is entitled, "Norton Products for the Pulp and Paper Industry." Information on pulpstones, markings and instructions for installation and use comprises the first part of the book. Also included are various tables, information on sharpening stones, saw sharpening and gumming. Another bulletin, "A Handbook on Thread Grinding" has also been issued. Both may be obtained free of charge from the Norton Company.

Robins Conveyors Division of Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J.—A new bulletin just issued by this company describes and illustrates their Robins Car Shakeout, which unloads hopper-bottom cars in a few minutes with two men. Ask for Bulletin No. 128-A.

SKF Industries, Inc., Front and Erie Sts., Philadelphia, Pa.—A comprehensive 60-page bulletin now available from this company explains how anti-friction bearings increase the rigidity and accuracy of machine tool spindles. Bearing applications for turning and boring equipment and grinding machines are discussed in detail. A section is devoted to engineering principles and also deals with bearing selection, load distribution, speed limitations, mounting and distribution. Ask for Bearings Catalogue.

Solvay Sales Corporation, 40 Rector St., New York 6—Recently announced by this company is a 100-page technical bulletin on the analysis of municipal and industrial waters. It contains sections on mineral analysis, stationary boiler water analysis, municipal water supplies, etc. It also contains information on reagents, indicators and standard solutions; conversion tables; a four-page index and a list of atomic weights. Copies may be had without charge by writing to the Advertising and Sales Promotion Department of this company, asking for Solvay Technical and Engineering Service Bulletin, No. 11, "Water Analysis."

Kurt Wandel Industries, Inc., Honey Brook, Pa. — Papermakers and pulp users will want this company's new bulletin which explains and illustrates the operation of the Dynopulper. A diagrammatic sketch of the machine illustrates its special construction features. This sketch is accompanied by a complete story of what it is, what it does, and how it works.

T. B. Wood's Sons Company, Chambersburg, Pa.—To enable paper manufacturers to choose the right model of their "GT" clutches and cut-off couplings, this company has issued Bulletin No. 290. It contains the data necessary for calculation of horsepower capacity requirements.

Books

The Chemistry and Technology of Plastics—Raymond Nauth, the author of this book is a Consultant in Plastics. He also is a Special Lecturer in Plastics at the Detroit Plastics Institute of Technical Instruction.

The text is divided broadly into five major sections; namely, Thermosetting Resins; Thermoplastic Resins; Cellulose Plastics; Synthetic Rubber, Natural Resins and Plywood; and Mold Design and Equipment.

Section I is made up of seven chapters—Introduction and History of the Plastics, Thermosetting Plastics, Amine Resins, Thermosetting Cast Resins, Amine-Aldehyde Resins, The Viscous Resins and Laminates.

Two chapters constitute Section II—Vinyl Polymers and Copolymers; and Acrylic, Polyamide, Organic Silicon and Polystyrene Resins. Section III also has two chapters—The Cellulose Plastics, and Regenerated Cellulose.

There are three chapters in Section IV; namely, Synthetic Rubber, Rubber-Like Plastics and Copolymers; Protein Plastics and Natural Resins; and Resin-Bonded Plywood and Veneer—one chapter in Section V, Mold Design, Presses and Equipment.

The book, totaling about 530 pages, is illustrated with numerous photos, drawings and graphs. Its publisher is Reinhold Publishing Corporation, 330 W. 42nd St., New York, N. Y.; its price, $9.50 a copy.

Manual of Employment Interviewing—Written by Frances S. Drake with the guidance and criticism of an advisory committee, this monograph published by American Management Association, 330 West 42nd Street, New York 18, N. Y., brings together diverse data that exists with respect to effective administration of the interview for employment purposes (and, more specifically, for rank-and-file jobs rather than for specialized positions on higher levels.) Among the major subjects treated in the monograph are: Types of Interviews, Physical Setting of the Interview, Techniques in Interviewing, The Standardized Interview, Selection Aids, and Related Selection Procedures. The book concludes with a list of selected readings for the interviewer.

The price of the monograph is $1.50 a copy to members of the American Management Association, $2.25 a copy to non-members.

New Developments In Hardwood Pulp (Bulletin No. 14)—This bulletin gives the full text of eight papers that were presented before a joint conference of the Northeastern Wood Utilization Council and the New York State College of Forestry, held on October 2, 1946, at Syracuse, N. Y. It also includes a transcript of the discussion pertaining to these papers. The titles of the papers and their respective authors follow: Hardwood Pulp Resources of the Northeast, V. L. Harper, Northeastern Forest Experiment Station; Recent Developments in Scandinavia, Edwin C. Jahn, New York State College of Forestry; German Work on Hardwood Pulping, Edward Farber, Timber Engineering Company; Problems in the Utilization of Hardwoods for Pulp, John N. McGovern, U. S. Forest Products Laboratory; Application of Neutral Sulfite Semi-Chemical Process to Northern Hardwoods, M. W. Phelps, Solvay Process Company; Research on Hardwood Pulp, C. E. Libby, New York State College of Forestry; Pulping with Nitric Acid, A. M. Malcolm (report on plant at Wolfen, Germany, for British Intelligence Objectives Sub-Committee); and Recent Developments in the Utilization of Sulfite Waste, Robert S. Aries, Northeastern Wood Utilization Council.

Published by Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn., the bulletin is priced at $2.00 a copy.

The O A Buyers Index of Office Utilities (1946-47 edition) — Compiled by O. R. Snapp, Office Appliances Service Bureau and published by The Office Appliance Company, 600 W. Jackson Blvd., Chicago 6, Ill., this work represents the first edition of a publication which, according to plans of the publisher, will be published annually. It opens with a section presenting an alphabetical list of manufacturers of office equipment and supplies. This section is followed with a product classification index, and an index of trade names and trade marks. The book is concluded with a listing of associations covering manufacturers, stationers, office machine dealers, etc. Paper-covered with plastic binding, the book, which also contains related advertising, totals 150 pages. The price of the book is $1.00 a copy.

Preparation of Company Annual Reports — Published by American Management Association, 330 West 42nd Street, New York 18, N. Y., this research report, prepared by Ernest Dale, assembles and analyzes the experience of accountants and auditors, company presidents, treasurers, public relations counselors and other top management personnel. It includes a survey of a number of annual reports and of the literature on the subject. The text broadly treats the subject in four major parts: namely, Criteria for Good Reporting; The Financial Narrative; The Non-Financial Narrative; and Preparation, Printing, Distribution. In the words of the author, the study is intended to provide a kit of tools which may enable the writers of annual reports to do a more effective job.

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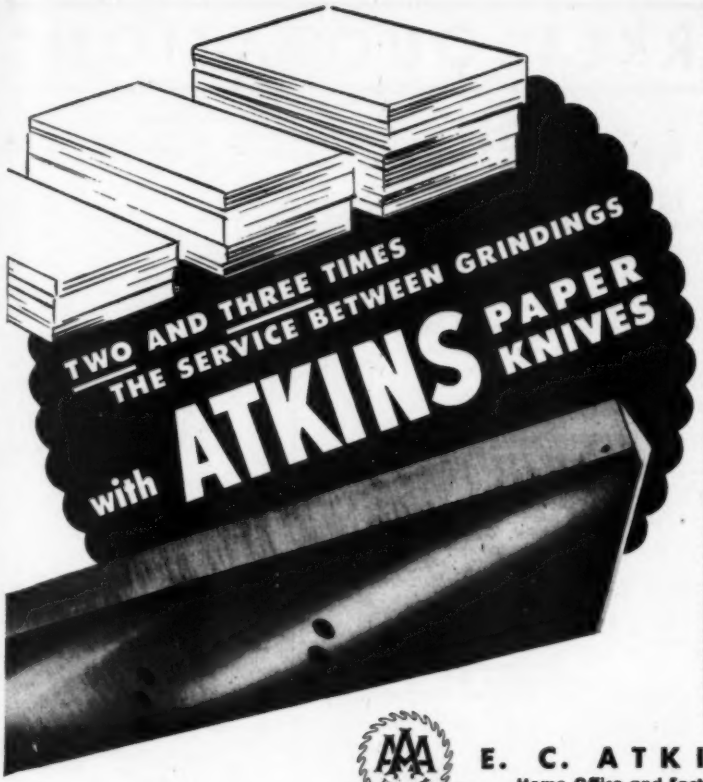

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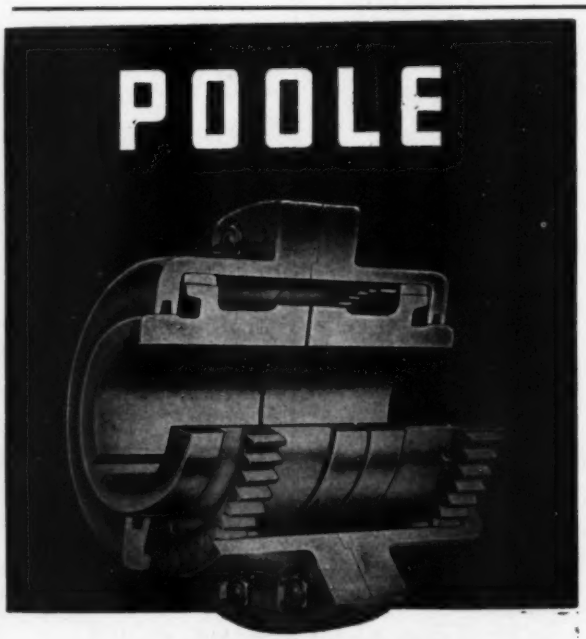

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Washables, No. 1	6.50 to 7.00
Percales	7.50 to 8.00
Light Prints, No. 1	7.50 to 8.00
Khaki Cuttings—	
Bleachable	7.00 to 7.50
Unbleachable	6.50 to 7.00
New White Canvas	11.00 to 12.00
New Mixed Blacks	5.00 to 5.25
Canton Flannels, Bleached	11.00 to 11.50
Shirt Cuttings—	
New White No. 1	12.50 to 13.00
White Shrunk	9.50 to 10.00
Silesias No. 1	9.00 to 9.50
New Unbleached	13.00 to 13.50
Fancy	7.00 to 7.50
Linen Cuttings—	
American	8.50 to 9.00
White	14.50 to 15.50
Grey	13.50 to 14.50

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(All Prices Are Nominal)

	per cwt.
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No. 1	2.10 to 2.15
No. 2	2.00 to 2.05
No. 3 and No. 4	1.80 to 1.90
Twos and Blues—	
Repacked	3.25 to 3.50
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Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75
Whites, No. 1—	
Repacked	4.50 to 4.75
Miscellaneous	3.75 to 4.00
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Repacked	3.50 to 3.75
Miscellaneous	3.00 to 3.25

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New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

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	per cwt.
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No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
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No. 1 small	5.50 to 5.75
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No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
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Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
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No. 2 sisal	5.00 to 5.25
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Soft White, Misc.	90.00—
Fly Leaf, No. 1	55.00—
Fly Leaf, Woody, No. 1	45.00—
No. 2 Mixed Col. Woody	35.00—
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Mixed Books	22.50 to 25.00
Ledger Stock—	
No. 1 white	90.00 to 95.00
No. 1 Mixed (Colored)	70.00 to 80.00
Manilas—	
New Env. Cuttings	130.00 to 140.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	80.00 to 85.00
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Kraft—	
New Envelope Cuttings	115.00 to 120.00
Tripled Sorted No. 1 100%	70.00 to 75.00
New 100% Cor. Cuts	65.00 to 70.00
No. 1 Old Assorted	50.00 to 55.00
News—	
White Blank	70.00 to 75.00
Overissue	27.50 to 30.00
No. 1 Baled	16.00 to 17.00
Old Corrugated Containers	28.00 to 30.00
New Corrugated Cuts	35.00 to 37.00
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Box Board Chips	11.00 to 12.00
No. 1 Mixed Paper	13.00 to 14.00

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Dry, barrels, pound	07.50—
Bleaching Powder—	
Drums, cwt.	3.00 to 3.50
Casein (Domestic Standard)	
20-80 mesh (bags), lb.	
80-100 mesh (bags), lb.	31.50 to 33.00
Argentine, lb.	27.00 to 28.00
China Clay—	
Domestic Filler Bulk (mine) ton	9.00 to 15.00
Domestic Coating Bulk (mine) ton	14.00 to 25.00
Imported (shtp side) Bulk (lump) ton	22.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.25 to 2.50
Gelatine (silicin), lb.	1.60 to 1.85
Glyc. (C.P.) drums, lb.	.20¼—
Litharge, powd., bbl., lb.	.16¼ to 17
Rosin (Gum)—	
New York, per 100 lbs.	
E	8.50—
F	8.50—
G	10.90—
WW	11.25—
Rosin (Wood), carlots	6.25—
Salt Cake—	
Dom. bulk (wks) ton	22.00 to 24.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	25.00 to ——
Soda Ash—	
Bulk (works), cwt.	1.00 to 1.15
Paper Bags, cwt.	1.25 to 1.35
Barrels, cwt.	1.35 to 1.60
Soda (Caustic)—	
Solid drums, cwt.	2.65 to 2.85
Ground and flake, drums, cwt.	3.00 to 3.25
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	6.37—
Pearl, barrels, cwt.	6.37—
Paper (Sp.) bags, cwt.	6.37—
Powdered, barrels, cwt.	6.48—
Sulphur (Crude) (Mine) bulk, long ton	16.00 to —
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.06½ to .07
Calcium Pig., bbls., lb.	.06¼ to .06¾
Zinc Sulphide, bbls., lb.	10.50—

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

(All Prices Are Nominal)

Bleached sulphite, Swedish	175.00 to 185.00
Bleached sulphite, Finnish	175.00—
Bleached sulphite, dom.	120.00 to 125.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	145.00 to 165.00
Unbleached sulphite, Fin.	145.00—
Unbleached sulphite, dom.	115.00—
Unbleached kraft, Swedish	140.00 to 155.00
Unbleached kraft, Finnish	140.00—
Unbleached kraft, northern	112.50 to 125.00
Unbleached kraft, southern	90.00 to 120.00
Bleached sulphite, Swedish	175.00 to 185.00
Bleached soda, domestic	120.00 to 125.00
Sulphite screenings, dom.	55.00 to 65.00
Sulphate screenings, dom.	55.00 to 65.00
Groundwood, domestic and Canadian	75.00 to 80.00

PAPER

f.o.b. New York City

(All Prices Are Nominal)

	per ton
Boards—	
Binders	94.00—
Chip	90.00—
Chip, tube and can	95.00—
Chip, full blending	97.50—
Chip, sgl. mla. lined	95.00—
Coated, white patent .016	120.00—
.020 and heavier	110.00—
Kraft liner	79.00—
Filled News	90.00—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.25—
B Grade E. F.	—
C Grade E. F.	—
D Grade E. F.	—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	19.55—
No. 2 Glossy	18.30—
No. 3 Glossy	17.60—
No. 4 Glossy	—
No. 2 Offset	15.25—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—

(In Ton Lots)	per cwt.
Extra 100% Rag	48.70—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	27.50—
25% Rag	24.50—
Rag Content Ledger—	
(In Ton Lots)	per cwt.
Extra 100% Rag	48.00—
100% Rag	42.10—
75% Rag	32.10—
50% Rag	28.25—
25% Rag	25.10—
Sulphite Bond—	
Air dry, watermarked	—
No. 1 watermarked	17.00—
No. 2 watermarked	16.00—
No. 4 watermarked	15.25—
Sulphite Ledger—	per cwt. Zone 1
No. 1 watermarked	17.60—
No. 2 watermarked	16.80—
No. 4 watermarked	16.10—
Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lbs. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof— Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
News—	per ton
Rolls, Standard (Contract)	90.00—
Rolls (Spot)	(Nominal)
Sheets	109.00—
Tissues (Carlots)—	per ream
White No. 1	1.70—
White No. 2	1.60—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.85—
Manilla	1.50—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M shts.) per cs.	7.50—
Toilet, Unbleached (M. shts.) per cs.	6.00—
Towels—	per case
Bleached	4.75—
Unbleached	4.00—
Wrappings (Kraft)—	per cwt.
Super-Standard	7.00 to 7.50
No. 1 Wrapping	6.50 to 7.00
Standard Wrapping	6.25 to 6.75
Standard Bag	6.25 to 6.75
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)

Bleached Papers—

	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only (10,000 lbs.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	—
Envy. Mla., Sub. 16-28 (No. 2)	—
Envy. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B20 lb.	—
Grade A-22 lb.	—

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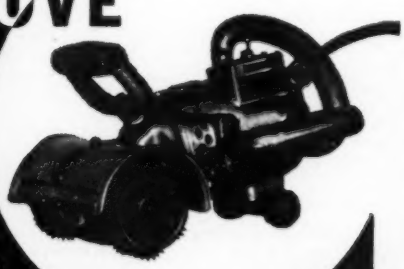

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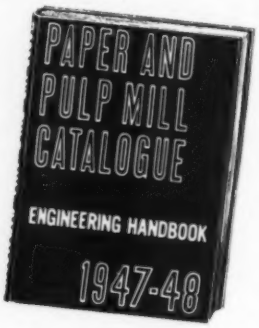

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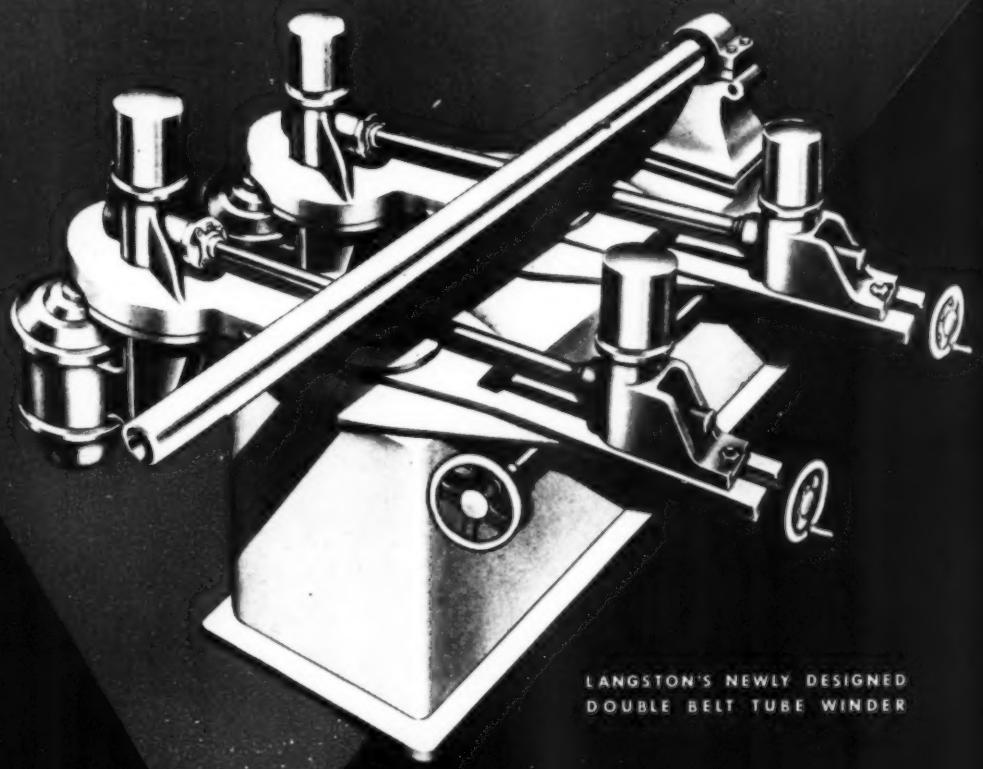

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LANGSTON

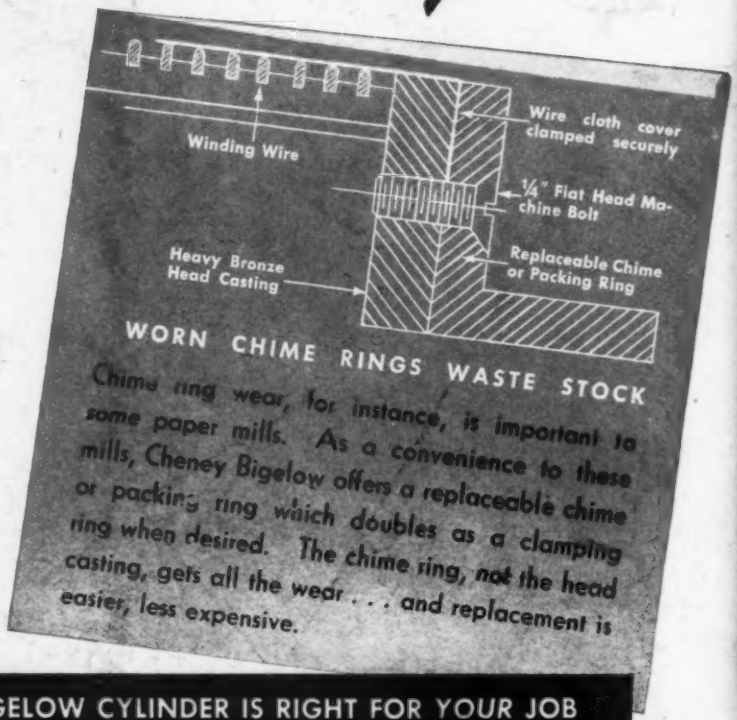
TUBE WINDING EQUIPMENT

THIS NEW DESIGN, NOW IN PRODUCTION, MARKS FURTHER ADVANCES IN THE FLEXIBILITY, ACCURACY, DEPENDABILITY OF LANGSTON TUBE WINDING EQUIPMENT. BY OPERATING THE TWO BELTS AT *DIFFERENT SPEEDS*, IT IS POSSIBLE TO SYNCHRONIZE SPEEDS WITH THE DIAMETER OF TUBE UNDER EACH BELT. (PATENT APPLIED FOR.) BOTH THE SINGLE AND DOUBLE BELT TUBE WINDERS HAVE A GREATER RANGE IN DIAMETER - FROM ... UP TO 13 ... FOR HIGH SPEED MACHINES WHICH AUTOMATICALLY PRODUCE ACCURATELY CUT, CLEAN, UNIFORMLY WOUND TUBES. SPECIFY LANGSTON. SAMUEL M. LANGSTON COMPANY, CAMDEN, NEW JERSEY.

Why Cheney Bigelow Cylinder Mould Improvements *Pay their Way*

If you're planning to buy new cylinder moulds as replacements or to increase your production, consider your mill conditions first. Have deflection, drainage rate, low PH, bearing surfaces, or chime ring wear caused you trouble? If they have, Cheney Bigelow Cylinder Moulds may be the answer.

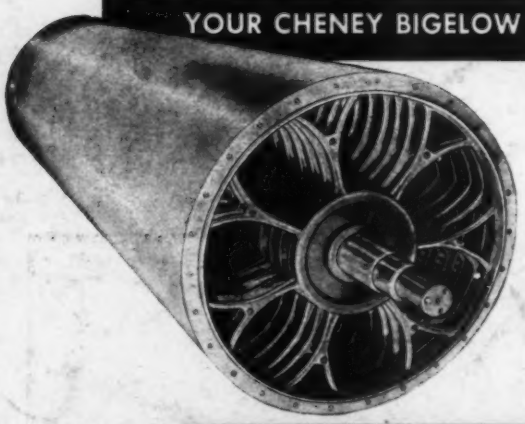
Often we can suggest improvements in your cylinder mould design that will give you better performance and lower maintenance costs. Such improvements often pay their own way. That's because Cheney Bigelow cylinder moulds are designed specially for *your* conditions, to *your* specifications.


Wire cloth cover clamped securely
Winding Wire
¼" Flat Head Machine Bolt
Heavy Bronze Head Casting
Replaceable Chime or Packing Ring

WORN CHIME RINGS WASTE STOCK

Chime ring wear, for instance, is important to some paper mills. As a convenience to these mills, Cheney Bigelow offers a replaceable chime or packing ring which doubles as a clamping ring when desired. The chime ring, not the head casting, gets all the wear . . . and replacement is easier, less expensive.

YOUR CHENEY BIGELOW CYLINDER IS RIGHT FOR YOUR JOB



This is only one example of why Cheney Bigelow Moulds are *right* for the job. If you'd like to know other reasons, send for your cylinder mould catalog. Cheney Bigelow Cylinders are designed by experts to *your* specifications, of bronze, carbon steel, stainless steel, or a combination of these metals. Write Cheney Bigelow Wire Works, 417 Liberty Street, Springfield, Mass.

CHENEY BIGELOW

Fourdrinier Wires • Dandys • Cylinders • Wire Cloth

Pulp and Paper Mill Equipment